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MASTER TRUCKS

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- 6 ton Tractor "T"

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XXXIX NEW YORK—THURSDAY, AUGUST 22, 1918—CHICAGO No. 8

Motor Transport Corps Under Brig.-Gen. Drake

President and Secretary Baker Reinstate Old Organization—New Corps Will Have Control of All Motor Apparatus Except Ambulances, Tanks and Tractors

New Régime Fathered Standardized War Truck Program A Year Ago

SHAKE-UP IS A REBUKE TO LOBBYING AND POLITICS PLAYED IN LAST EIGHT MONTHS

By Allen Sinsheimer

WASHINGTON, Aug. 20—The Motor Transport Corps of the United States Army, completely controlling all motorized vehicles excepting creeper-type tractors, has been formed by a Presidential order.

This department is directly responsible to General Peyton C. March, Chief of Staff, and to the General Staff. It is headed by Brig.-Gen. C. B. Drake, who was formerly a colonel under Brig.-Gen. Chauncy B. Baker, who was in charge of the original Motor Transport Section of the Quartermaster Department.

The new order abolishes the present Motor Transport Service of the Quartermaster Corps, which is headed by Col. Fred Glover. Colonel Glover will remain with the Quartermaster Department. Col. E. S. George, who was second in command under Glover, will be transferred back to the Signal Corps or possibly to the Air Service.

Col. James F. Furlow, who was lieutenant-colonel under General Baker, will be second in command of the new Corps. Colonel Furlow is now a colonel in the General Staff and will be detailed from it, together with Lieut.-Col. Seamon, to the Motor Transport Corps. Lieut.-Col. Seamon will be third in command. It is likely that General Drake will have the title of Director, and Colonel Furlow, Deputy Director. It is considered probable that the original AA ¾-ton truck and the A 1½-ton truck will be reinstated in the program, and will be ordered in large quantities. The B 3-ton truck will, of course, be retained.

The new Corps will have complete charge of the technical supervision of all motor vehicles, design, production, procurement, storage and supply of them and the

COLONEL C. B. DRAKE

of the General Staff, who will be Brigadier General in charge of the Motor Transport Corps

parts, and their operation, maintenance and salvage. Provision is made in the order giving complete control of all motorized vehicles to the Corps except those used for special purposes by various army departments, such as ambulances for the medical department, over which the Motor Transport Corps will merely maintain supervision after they have been produced and delivered to the medical department.

The Motor Transport Board, which was created earlier this year and is composed of a representative of each army division interested in or using motorized vehicles, will be retained to participate in the design or construction of vehicles by suggestion. Officers of the Motor Transport Corps will be detailed to each army division, corps and department to be in command of the Motor Transport Corps within the limits of that division.

All existing contracts for motor vehicles, motor vehicle equipment and supplies, maintained, operating and repairing of motor vehicles will be taken over by the Motor Transport Corps, which will make all future purchases and disbursements.

This complete reorganization and shake-up is pregnant with significance. It marks the end of a year which has been filled with upheavals in the military truck field. A year ago the military trucks and other motorized vehicles were under the control of the Motor Transport Section of the Quartermaster Corps, chief of which was General Baker. Christian Girl was in charge of production. In the summer of 1917 General Baker, assisted by numerous engineers from the automobile industry, developed the design for three types of trucks to be manufactured by truck makers of this country, and which were regarded as trucks especially designed for our army. They comprised the AA ¾-ton, the A 1½-ton and the B 3-ton models. The B truck was designed and completed first. The first models were delivered in Washington late in 1917 and received officially by President Wilson and Secretary of War Newton D. Baker. Eighteen thousand of these have been ordered and more than 10,000 delivered.

Opposition developed to the standardized trucks, as these were known[1] because of their standardization of parts and uses. Some truck manufacturers claimed that the trucks were not equal to their privately made commercial trucks. Some objected to the low margin of profit. Others were anxious to foist their own products on the Government.

There was considerable propaganda. There were reports pro and con about the stability of the trucks. Politics were played. Changes in organization came. The Motor Transport Service was formed a few months ago and tests were held of all makes of trucks. The B truck was retained under the new régime. The original A was discarded and replaced by the White 1½-ton truck. The original AA was discarded and replaced by the G. M. C. truck.

After ten weeks of control the Motor Transport Service has been disorganized in part and the old organization reinstated.

The organization which was under Mr. Girl, who resigned last spring, is to be retained by General Drake. Capt. E. R. Finkenstadt will remain in charge of B truck production; George Randles will supervise operations; Captain Miller will retain control of production of passenger cars, trailers, motorcycles and bicycles; and Guy Morgan will have charge of spare parts, tire and accessory purchases. D. C. Hess will remain in charge of priorities. The various branch offices at Chicago, New York, Cleveland and Detroit, it is expected, will be retained in their present form.

The new order is regarded here as decisive and as a rebuke to those who have interfered by means of lobbies and politics during the past year with the motorization program of the army.

General Drake has been connected for many years with the military motor truck development and problems. He is by the new order directly responsible to the Chief of Staff, and, since the order creating the Motor Transport Corps and appointing General Drake was signed by the President and the Secretary of War, these two high officials are practically in a position of vouching for him. Consequently, as a high army official put it to-day, "The election is now over," and hereafter it may be expected that motorized vehicle purchases, procurement and production will be conducted without outside influence and that those individuals who persist in using political methods may expect scant consideration.

Following is the complete general order creating the new Motor Transport Corps:

Text of Presidential Order Creating Motor Transport Corps

General Orders No. 75 — *WAR DEPARTMENT, Washington, August 15, 1918.*

1—*There is created during the existing emergency, a Motor Transport Corps.*

2—*There will be detailed a Chief of the Motor Transport Corps.*

3—*In this order, unless special exceptions are made, the term motor vehicle will be construed to include all bicycles, motorcycles, automobiles, trailers and trucks, by whatsoever staff corps or service they may have been originally supplied and for whatsoever purpose. All motor vehicles with cargo-carrying chassis are classed as trucks. Tractors of the caterpiller type, designed primarily for traction purposes and tanks, are excepted from the provisions of this order, the Ordnance Department being charged with the responsibility for their supply and maintenance.*

4—*The functions of the Motor Transport Corps are:*

a—The technical supervision of all motor vehicles.

b—The design, production, procurement, reception, storage, maintenance and replacement of all motor vehicles, and accounting for same.

c—The design, production, procurement, storage and supply of spare and repair parts, tools, accessories and supplies of all motor vehicles, and accounting for same.

d—The establishment and operation of all Motor Transport Corps garages, parks, depots and repair shops.

e—The procurement, organization and technical training of Motor Transport Corps personnel.

f—The salvage and evacuation of damaged motor vehicles.

g—The homogeneous grouping of motor vehicles.

h—The operation, in accordance with instructions from the proper commanding officer as to their employment, of groups of motor vehicles of "First Class" as defined in paragraph 5 below.

i—The preparation of plans for hauling cargo and personnel over military roads, or roads under military control will be under the control of the Motor Transport Corps.

j—The procurement, supply, replacement and preliminary training before assignment to combatant organizations, of personnel for operation of motor vehicles of the second class, will be made by the Motor Transport Corps.

5—With respect to the control exercised over them by the Motor Transport Corps motor vehicles are grouped into two classes, viz:

First Class: Those the operation of which the Motor Transport Corps controls in the United States and overseas, and for the efficient functioning of which as transportation units it is directly responsible.

Second Class: Those over which the Motor Transport Corps exercises merely technical supervision in the United States and overseas.

The first class includes all cargo-carrying or passenger-carrying motor vehicles used for general transportation purposes and the motorized portion of such reserve trains as may be held for general transportation purposes in rear of an army, under control of the army commander.

The second class includes all motor vehicles not included in First Class. Substantially these will be such motor vehicles as are assigned by Tables of Organization to organizations such as divisions, corps, troops and army troops.

The Motor Transport Corps controls the operation of First Class vehicles, but merely maintains a technical supervision over the operation of Second Class vehicles. This technical supervision will, however, be interpreted very broadly by all concerned. Bulletins will be published from time to time concerning the proper methods of operation, care and maintenance of motor vehicles. Motor Transport Corps officers will keep themselves constantly informed as to how motor vehicles of the organization to which they are attached are being used and will report to the proper commanding officers any abuse which they discover. The commanding officers to whom such reports are made will hold to strict responsibility any officers who have motor vehicles under their control which have been in any way damaged or injured on account of disregard of the proper methods of operation, care and maintenance laid down by such bulletins.

When vehicles are placed in the Second Class, the Motor Transport Corps officer supervising them has no authority to determine the use to which they are put; he merely guarantees that they shall perform as efficiently as possible whatever work the commanding officer chooses to assign them.

When vehicles are placed in the Second Class, the commanding officer of the unit to which they are allotted is directly responsible for their efficient functioning, to the same degree as is the Motor Transport Corps officer for vehicles in the First Class.

6—All garages, parks, depots, repair shops and similar establishments of the Motor Transport Corps will be manned and operated by Motor Transport Corps personnel, and their commanding officers will report direct to the Motor Transport Corps officer on the staff of the unit or of the organization to which they are attached. Any such establishments which may now be in existence are hereby placed under the control of the Motor Transport Corps in the manner stated above.

COLONEL J. F. FURLOW

who will be second in command of the newly organized Motor Transport Corps

7—Motor vehicles and their spare parts, motor vehicle shops and shop equipment, tools and accessories purchased by other staff corps or services will be turned over to and invoiced to the Motor Transport Corps and assigned by the Motor Transport Corps in accordance with the Tables of Organization, and as the best interests of the service dictate, regardless of their original source of procurement; except that ambulances and non-cargo and non-personnel carrying motor vehicles such as mobile repair shops, especially designed for Ordnance, Signal Corps and Engineering Corps, gun mounts, rolling kitchens, laboratory trucks, wireless trucks, photographic trucks, searchlight trucks, water sprinklers, will be held by the Motor Transport Corps subject to the orders of the staff corps or service for which they have been purchased. In the case of such ambulance and non-cargo carrying vehicles, the Motor Transport Corps will provide parking facilities for their reception and furnish facilities for the maintenance of the chassis and of such other parts as may be arranged for between the Motor Transport Corps and the other staff corps or service concerned. Property accounting for all motor vehicles and for chassis of special vehicles above mentioned will be made to the Chief of Motor Transport Corps.

8—All questions which may hereafter arise affecting the design or construction of motor vehicles procured by or for any staff corps or service, in so far as concerns the chassis, or any element with the supply or maintenance of which the Motor Transport Corps is concerned, will be decided by approved recommendation of the Motor Transport Board, appointed by Special Orders, No. 91, War Department, 1913, with a view of securing standardization of design and type and of facilitating repair and replacement.

9—The chief of each staff department now purchasing or operating motor vehicles will submit on or before August 31, 1918, a list of all personnel and organization who are performing Motor Transport duty under provisions of paragraphs 4 and 5 preceding. He will submit with the list the names of technical personnel which he desires to retain for use under provisions of paragraph 7 preceding. All personnel and organization except that approved to be retained, will be transferred to the Motor Transport Corps on August 31, 1918.

10—In each army, corps and division, the army artil-

(CONTINUED ON PAGE 346)

Agricultural States Leaders in Cars and Trucks

Total Now in Use in U. S. Is 5,466,931, an Increase of 525,665 in Six Months

THE gain of 525,665 motor vehicle registrations between January 1 and July 1 of this year when analyzed shows that this gain is not made up in the large population areas but rather through the grain belt of the Mississippi Valley and the Solid South, which started its motor boom over a year ago.

The registration figures for the first six months of this year afford the first real opportunity of studying the use and distribution of motor vehicles under war conditions. Registration begins in most states with the opening of the year, and the registration figures of July 1 as compared with January 1 afford a definite basis of studying trends as influenced by the war.

The total motor vehicle registration as of July 1, 1918, was 5,466,931 net, that is, not including any duplicate registrations. For the first time the five and one-half million figure was almost reached. The registrations last January showed that 4,941,276 motor vehicles were in registered use. The figures as of July 1 show a 10 per cent increase.

These figures include automobiles, trucks, motor buses and trailers where the latter are registered. From this figure all duplicate registrations have been subtracted, so that 5,466,931 pretty accurately represents the vehicles in use on July 1.

For the first time several states show a reduction in registrations as compared with January 1 of this year, a fact which might indicate that there are in such states many cars that have not been registered and which obviously cannot be in service but are perhaps in storage. It is quite surprising that of the six states that have a smaller registration, or show a shrinkage in the last six months, three are typical agricultural states, two of them manufacturing states and one falls into a miscellaneous classification.

The six states showing an actual loss include Massachusetts and New

Cars and Trucks in United States July 1, 1918

ALL DUPLICATE REGISTRATIONS DEDUCTED

New York	422,853
Ohio	415,962
Illinois	362,742
Iowa	325,000
Pennsylvania	324,184
California	291,667
Michigan	236,981
Indiana	207,381
Texas	198,369
Minnesota	188,709
Kansas	185,000
Wisconsin	182,700
Missouri	164,790
Nebraska	159,500
Massachusetts	156,798
New Jersey	124,519
Washington	100,722
Oklahoma	91,700
Georgia	89,481
Connecticut	75,900
South Dakota	71,800
Colorado	71,600
North Dakota	68,824
Virginia	65,000
North Carolina	61,946
Maryland	61,012
Kentucky	57,543
Oregon	57,066
Tennessee	51,900
South Carolina	47,950
Montana	46,865
Alabama	44,859
Florida	42,846
Arkansas	39,000
Maine	38,439
Louisiana	37,600
Mississippi	37,500
Dist. of Col.	36,969
West Virginia	34,371
Idaho	27,810
Rhode Island	26,399
Utah	23,850
New Hampshire	21,230
Arizona	21,180
Vermont	19,765
New Mexico	15,745
Wyoming	14,150
Delaware	11,129
Nevada	7,625
Total	5,466,931

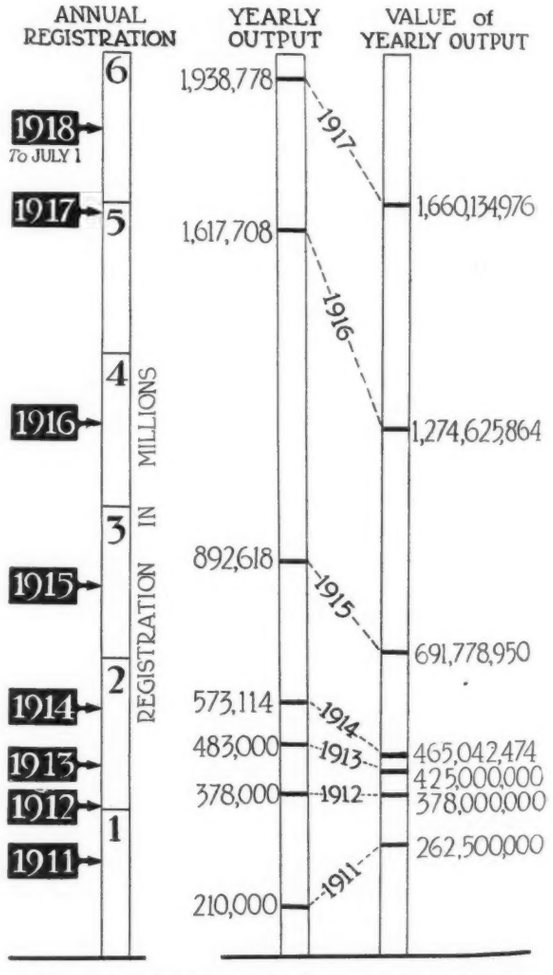


Chart showing the yearly increases in registration, output and value of cars and trucks since 1911

Distribution of cars and trucks in the United States, all duplicate registrations being deducted

Automobile, Truck and Motorcycle Registrations in the United States to July 1, 1918

State or Territory	Gross Registration	New Registration	Registration Up to Jan. 1 1918	Gasoline Passenger Cars in Use	Gasoline Commercial Cars in Use	Electric Passenger Cars in Use	Electric Commercial Cars in Use	Non-Resident Registration*	Re-Registered**	Chauffeurs Registered	Total Fees	Motor-cycles Registered†
Alabama	44,859	11,986	32,873	36,844	8,015	.....	.....	.....	.....	.....	.....	
Arizona	21,804	1,914	19,890	.....	.....	6	.....	.....	624	318	131,513	
Arkansas	39,000	10,138	28,832	37,500	1,500	.....	.....	.....	.....	.....	390,000	.....
California	314,918	69,052	245,866	.....	.....	.....	.....	.....	23,251	9,900	3,115,924	21,309
Colorado	73,200	6,350	66,850	.....	.....	.....	.....	1,600	.....	12,400	308,530	4,500
Connecticut	75,900	1,258	74,642	62,300	13,600	.....	.....	.....	.....	85,000	1,129,712	4,000
Delaware	11,658	958	10,700	.....	.....	.....	.....	.....	529	13,677	156,802	683
Dist. of Col	36,969	15,771	21,198	31,634	4,736	599	.....	.....	.....	9,851	137,083	1,920
Florida	43,746	4,530	39,216	39,243	4,503	.....	.....	.....	900	3,609	328,539	1,494
Georgia	89,876	17,025	72,851	85,326	4,550	.....	.....	.....	395	4,300	310,473	3,005
Idaho	28,800	4,084	24,716	.....	.....	3	.....	.....	190	750	525,509	600
Illinois	362,742	22,450	340,292	.....	.....	.....	.....	.....	.....	38,186	2,571,505	.....
Indiana	209,346	17,154	192,192	.....	.....	.....	.....	.....	1,965	3,804	1,170,732	7,563
Iowa	325,000	46,787	278,213	.....	.....	.....	.....	.....	.....	.....	.....	7,000
Kansas	185,000	25,658	159,342	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	57,543	10,143	47,400	.....	.....	.....	.....	.....	.....	.....	.....	1,212
Louisiana	38,000	6,350	31,650	.....	.....	.....	.....	.....	400	.....	.....	400
Maine	39,538	.....	41,499	35,929	3,609	.....	.....	.....	1,099	46,873	502,297	1,178
Maryland	63,827	2,884	60,943	57,985	5,411	221	210	.....	2,815	8,173	751,142	4,180
Massachusetts	166,384	.....	174,274	136,684	29,700	.....	.....	.....	9,586	26,368	1,843,595	10,074
Michigan	242,712	16,019	226,693	219,292	23,420	.....	.....	285	5,446	19,420	2,569,137	6,505
Minnesota	188,709	.....	192,000	.....	.....	.....	.....	.....	.....	4,000	943,545	4,128
Mississippi	37,500	5,850	31,650	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	170,001	18,974	151,027	.....	.....	.....	.....	.....	5,211	18,110	1,335,914	3,320
Montana	47,350	4,601	42,749	.....	.....	.....	.....	.....	485	1,204	320,088	722
Nebraska	159,500	11,499	148,001	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nevada	7,625	740	6,885	.....	.....	.....	.....	.....	.....	.....	33,227	105
New Hampshire	22,433	166	22,267	.....	.....	.....	.....	703	500	8,200	290,070	1,940
New Jersey	137,322	.....	141,918	124,006	13,116	200	.....	.....	12,803	168,267	1,420,037	10,307
New Mexico	15,745	1,659	14,086	.....	.....	.....	.....	.....	.....	.....	.....	249
New York	422,853	11,903	410,950	335,245	67,330	.....	.....	.....	.....	122,873	3,571,410	24,838
North Carolina	62,071	6,121	55,950	.....	.....	.....	.....	125	.....	.....	326,979	1,432
North Dakota	68,824	5,831	62,993	.....	.....	.....	.....	.....	.....	.....	424,985	1,537
Ohio	425,789	83,159	342,630	.....	.....	4,265	.....	.....	9,827	.....	.....	20,182
Oklahoma	91,700	.....	100,199	.....	.....	.....	.....	.....	.....	.....	.....	1,182
Oregon	57,066	8,434	48,632	52,324	4,692	.....	50	.....	.....	.....	.....	.....
Pennsylvania	344,877	19,724	325,153	319,498	25,379	.....	.....	.....	20,693	.....	3,538,057	21,907
Rhode Island	26,399	1,257	25,142	21,413	4,986	.....	.....	.....	.....	20,200	139,564	1,435
South Carolina	48,350	10,028	38,322	.....	.....	.....	.....	.....	400	.....	275,153	971
South Dakota	78,000	10,842	67,158	.....	.....	.....	.....	.....	6,200	.....	.....	1,008
Tennessee	54,000	5,500	48,500	.....	.....	.....	.....	.....	2,100	.....	.....	800
Texas	214,560	.....	219,721	.....	.....	.....	.....	103	16,088	14,867	1,754,576	2,422
Utah	24,600	3,024	21,576	.....	.....	.....	.....	.....	750	1,300	.....	1,125
Vermont	20,431	64	20,367	18,795	1,627	8	1	.....	666	3,390	362,964	606
Virginia	65,000	9,339	55,661	.....	.....	.....	.....	.....	.....	3,680	.....	2,000
Washington	100,722	6,900	93,822	87,756	12,966	.....	.....	.....	.....	.....	758,620	5,099
West Virginia	36,400	5,094	31,306	.....	.....	.....	.....	608	1,421	3,363	603,072	996
Wisconsin	182,700	18,169	164,531	177,000	5,700	.....	.....	.....	.....	.....	1,862,565	6,000
Wyoming	14,150	1,649	12,501	.....	.....	.....	.....	.....	.....	.....	69,170	240
Total	‡5,595,499	529,135	5,085,859	1,878,774	234,840	5,302	261	3,424	124,344	652,083	$33,992,489	191,914

NOTE.—Steam cars and trucks are included with the gasoline vehicle statistics, as segregation is not carried out by registration officials. *Number of registered owned by citizens of other States. **Number of vehicles re-registered, owing to transfer of ownership, etc. .... Statistics not available. †This is an independent column, having no relation to the figures given in any other.

Jersey, both containing large centers of population and both manufacturing rather than agricultural states. Massachusetts had on July 1 7,890 fewer registrations than on January 1. New Jersey had 4,596 fewer July 1 than on January 1. The State of Maine also showed a decrease of 1,961 during the same period.

The remaining three states which show a decrease fall in the Mississippi Valley classification and are practically out-and out agricultural states. They are Minnesota, Texas and Oklahoma. Minnesota is 3,281 lower, Texas 5,161; and Oklahoma 9,499. Oklahoma shows the largest registration decrease of all six that are in the losing column. Unquestionably the dry weather in the past year has had something to do with the falling off in Texas and Oklahoma, but no reason can be advanced for the reduction in Minnesota.

All six of these losing states showed large gains in the first 6 months of 1917, as the following comparative figures will show:

State	Gain first six months 1917	Loss first six months 1918
Oklahoma	19,728	9,499
Massachusetts	6,061	7,890
Texas	2,313	5,161
New Jersey	44,253	4,596
Minnesota	30,500	3,281
Maine	3,618	1,961
Total	106,473	32,388

In these six states there is a total loss in registrations July 1 as compared with January 1 of 32,388 vehicles. When these figures are contrasted with those for the first six months of 1917, when there was a registration gain of 106,473, the influence of the war on certain sections becomes at once apparent.

In the cases of New Jersey and Massachusetts unquestionably the drop in registration is largely due to the falling off in sales in the large population centers in each state. New Jersey is just across the Hudson river from New York City; in fact, a very large percentage of the business men and women of New York City live in Jersey and their automobiles would come under Jersey registration. Massachusetts has the Boston population.

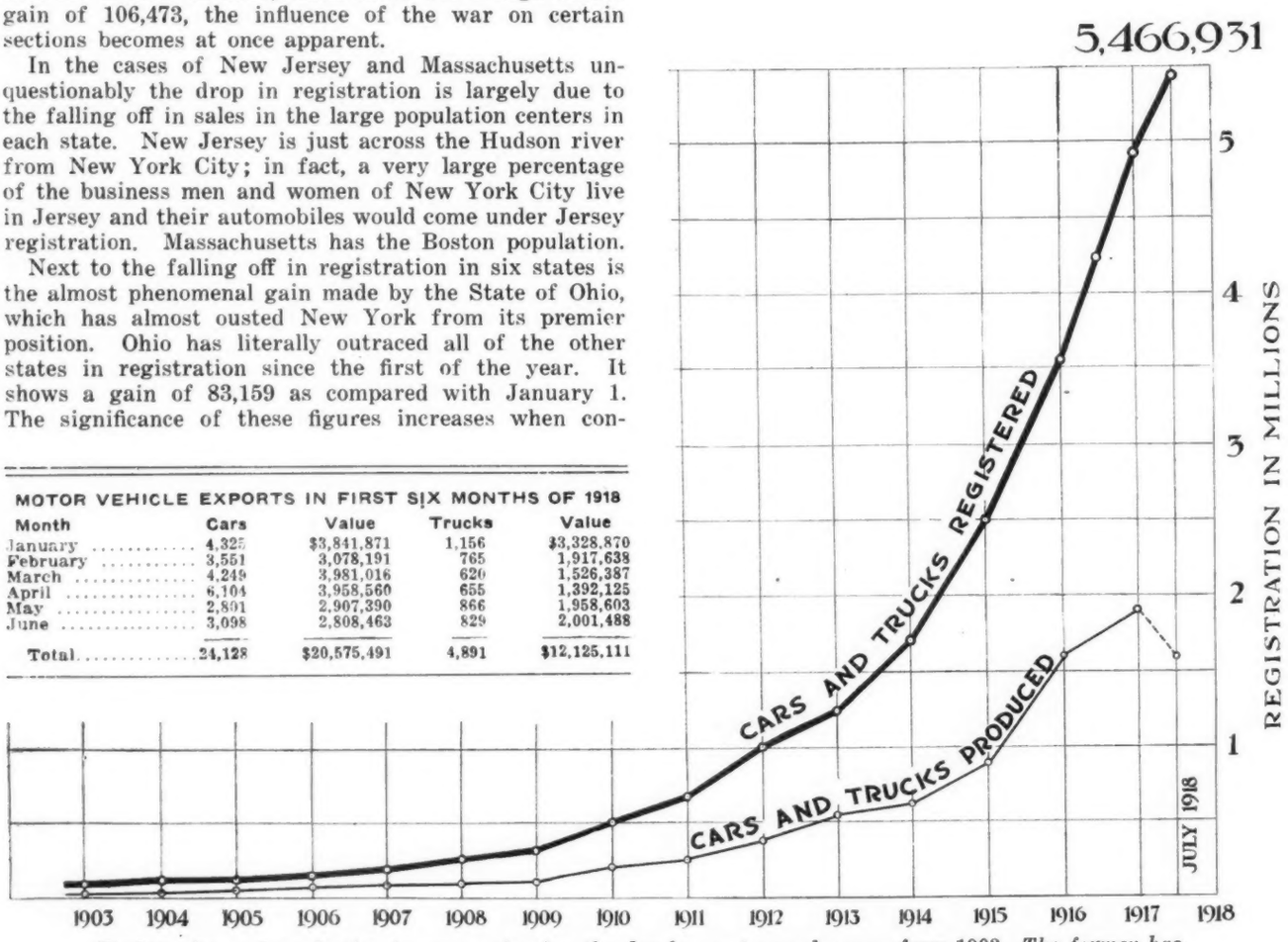
Next to the falling off in registration in six states is the almost phenomenal gain made by the State of Ohio, which has almost ousted New York from its premier position. Ohio has literally outraced all of the other states in registration since the first of the year. It shows a gain of 83,159 as compared with January 1. The significance of these figures increases when con-

DISTRIBUTION OF CAR, TRUCK, TRACTOR AND ENGINE MANUFACTURERS IN THE UNITED STATES AND CANADA

State	Cars	Trucks	Tractors	Engines	Total
California	4	9	8	..	21
Colorado	1	..	..	..	1
Connecticut	2	2	..	3	7
Delaware	..	1	..	..	1
District of Columbia	..	1	..	..	1
Georgia	..	3	..	..	3
Illinois	17	35	18	4	74
Indiana	26	14	7	5	52
Iowa	..	6	7	1	14
Kansas	1	1	1	..	3
Kentucky	2	2	1	..	5
Louisiana	..	1	..	..	1
Maine	..	..	1	..	1
Maryland	1	1	..	..	2
Massachusetts	5	14	3	1	23
Michigan	40	44	13	17	114
Minnesota	7	11	23	2	43
Missouri	4	6	7	..	17
Nebraska	1	2	1	1	5
New Hampshire	..	1	..	..	1
New Jersey	3	6	1	1	11
New York	16	37	6	7	66
North Carolina	..	1	..	..	1
North Dakota	..	..	1	..	1
Ohio	27	38	13	6	84
Oklahoma	3	2	1	..	6
Pennsylvania	8	28	5	6	47
Rhode Island	..	1	..	..	1
South Carolina	1	..	..	..	1
South Dakota	..	..	2	..	2
Texas	2	2	1	..	5
Virginia	2	..	1	..	3
Washington	1	4	3	..	8
West Virginia	1	..	..	..	1
Wisconsin	6	12	17	8	43
Canada	17	10	4	..	31
Total	198	295	145	72	700

MOTOR VEHICLE EXPORTS IN FIRST SIX MONTHS OF 1918

Month	Cars	Value	Trucks	Value
January	4,325	$3,841,871	1,156	$3,328,870
February	3,551	3,078,191	765	1,917,638
March	4,249	3,981,016	620	1,526,387
April	6,104	3,958,560	655	1,392,125
May	2,891	2,907,390	866	1,958,603
June	3,098	2,808,463	829	2,001,488
Total	24,128	$20,575,491	4,891	$12,125,111



Registration and production in curves showing the development year by year from 1903. The former has risen steadily and consistently, but the production curve has been slightly irregular

Dealers, Garages, Machine Shops and Supply Houses in Operation

State	Dealers	Garages	Repair-shops	Jobbers	Supplies Exclusively	Cos. Having Supply Depts.	Totals
Alabama	191	119	83	3	26	51	473
Arizona	131	107	64	..	12	47	361
Arkansas	208	120	74	1	20	50	473
California	1,309	1,413	967	17	170	450	4,326
Colorado	351	329	180	2	24	141	1,027
Connecticut	486	478	291	7	85	156	1,503
Delaware	70	71	27	..	6	21	195
Dist. of Col.	51	53	32	2	18	10	166
Florida	293	267	159	2	36	117	874
Georgia	321	297	170	2	61	105	956
Idaho	174	124	70	1	15	66	450
Illinois	2,066	1,970	1,093	17	133	622	5,901
Indiana	1,013	822	369	10	66	308	2,588
Iowa	1,645	1,383	768	8	67	699	4,572
Kansas	957	873	440	8	33	357	2,668
Kentucky	306	245	99	3	25	78	756
Louisiana	165	90	52	4	20	36	367
Maine	361	292	124	3	18	128	926
Maryland	235	244	111	2	29	73	694
Massachusetts	838	943	419	17	142	239	2,598
Michigan	957	835	349	8	96	297	2,542
Minnesota	1,113	843	449	15	41	279	2,740
Mississippi	157	98	37	..	15	44	351
Missouri	835	670	382	16	62	216	2,141
Montana	263	224	127	2	15	93	724
Nebraska	356	680	270	11	21	231	1,569
Nevada	53	56	25	..	4	18	156
New Hampshire	194	217	103	..	10	98	622
New Jersey	699	946	446	1	88	256	2,436
New Mexico	95	95	36	..	7	47	280
New York	2,023	2,435	1,175	14	334	678	6,659
North Carolina	317	257	112	1	25	104	816
North Dakota	477	324	177	1	10	141	1,093
Ohio	1,736	1,322	648	26	143	509	4,384
Oklahoma	464	344	143	2	29	149	1,131
Oregon	237	233	112	2	27	75	686
Pennsylvania	1,803	1,817	824	18	216	681	3,839
Rhode Island	95	137	87	5	..	18	342
South Carolina	225	130	68	2	19	57	501
South Dakota	449	340	151	2	11	109	1,062
Tennessee	237	153	114	3	28	76	611
Texas	820	653	284	12	90	217	2,076
Utah	107	71	49	3	13	26	269
Vermont	180	161	96	..	9	75	521
Virginia	303	203	120	2	47	76	751
Washington	417	332	182	6	51	100	1,088
West Virginia	261	158	69	..	17	72	577
Wisconsin	1,029	900	406	10	47	327	2,719
Wyoming	80	67	38	..	9	23	217
Ter. of Hawaii	11	8	10	..	5	9	43
West Indies	28	24	3	..	4	9	68
Canada	970	853	357	21	75	211	2,487
Mexico	8	10	3	..	2	2	25
Total	28,619	25,836	13,040	292	2,589	9,106	79,482

trasted with New York State, where the gain in the same period is only 11,903 registrations. Ohio has more than seven times this gain.

Not only has Ohio outstripped New York State in gains in the 6 months, but it is close on the heels of the Empire state in total registrations. Ohio now has registered as of July 1 415,962 and New York State on the same date had 422,853. If Ohio continues to gain on registrations for the second 6 months of the year as she has in the first, she will be leading New York by January 1.

Ohio, of all states in the Union, has made greatest gains. Next to her comes California with a registration gain in the same 6 months of 69,052. Iowa, one of the premier farming states and the leading state in number of automobiles in relation to number of population comes third in registration gains this year, its figures showing a gain of 46,787. These three states are by long odds the leaders in registration gains this year, in fact, the others can scarcely be classed as a good second in the running. Pennsylvania, which in 1917 was a big gainer, only shows 19,724 more registrations on July 1 than on January 1 this year as compared with over 35,000 increase a year ago.

It is difficult to reason out just why Ohio should so far outstrip New York, Pennsylvania, Illinois and other states if it is not that the state is a leader in agriculture, and is also a strong manufacturing state, holds a high position in mining and has crude oil interests as well. It seems to be the general prosperity of all of these fields that have combined to put the state in the first place in registration gains.

Apart from the Ohio leadership the utilitarian aspect of the automobile is well evidenced by the fact that practically the fifteen states that lead in registration gains are agricultural states. The list is headed by Ohio, California and Kansas, all three agricultural leaders; and following them come a group of farming states such as

(*Continued on page* 339)

Increase in Registration

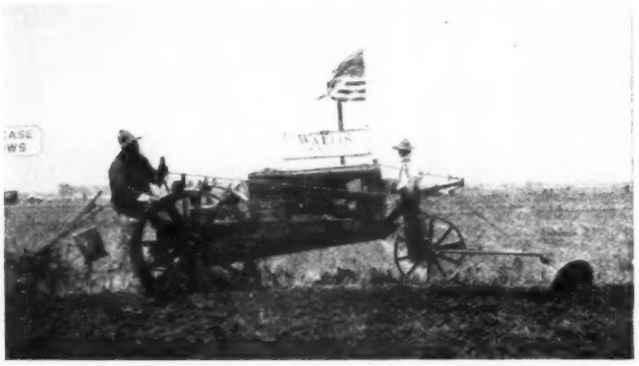
State	Increase in Cars	Per Cent Increase
Ohio	83,159	24
California	69,052	24
Iowa	46,787	17
Kansas	25,658	16
Illinois	22,450	6
Pennsylvania	19,724	6
Missouri	18,974	18
Wisconsin	18,169	11
Indiana	17,154	8
Georgia	17,025	23
Michigan	16,019	7
Dist. of Columbia	15,771	74
Alabama	11,986	36
New York	11,903	2
Nebraska	11,499	7
South Dakota	10,842	16
Kentucky	10,143	21
Arkansas	10,138	35
South Carolina	10,028	26
Virginia	9,339	17
Oregon	8,434	17
Washington	6,900	7
Colorado	6,350	9
Louisiana	6,350	6
North Carolina	6,121	11
Mississippi	5,850	18
North Dakota	5,831	9
Tennessee	5,500	11
West Virginia	5,094	13
Montana	4,601	10
Florida	4,530	10
Idaho	4,084	13
Utah	3,024	14
Maryland	2,884	4
Arizona	1,914	9
New Mexico	1,659	12
Wyoming	1,649	13
Connecticut	1,258	1
Rhode Island	1,257	5
Delaware	958	8
Nevada	740	10
New Hampshire	166	.7
Vermont	64	.3
*Maine	....	..
*Massachusetts	....	..
*Minnesota	....	..
*New Jersey	....	..
*Oklahoma	....	..
*Texas	....	..
Total	530,568	..
Average increase		12

Registration and Population

State	Pop. July 1, 1917 Census	Cars and Trucks	Pop. Per Car
Iowa	2,224,771	325,000	6
Nebraska	1,284,126	159,500	8
Dist. of Colum	369,282	36,969	9
South Dakota	716,972	71,800	9
California	3,029,032	291,667	10
Kansas	1,851,870	185,000	10
Montana	472,935	46,865	10
North Dakota	765,319	68,824	11
Arizona	263,738	21,180	12
Minnesota	2,312,445	188,709	12
Ohio	5,212,085	415,962	12
Colorado	988,320	71,600	13
Indiana	2,835,492	207,381	13
Michigan	3,094,266	236,981	13
Wisconsin	2,527,167	182,700	13
Wyoming	184,970	14,150	13
Nevada	110,738	7,625	15
Oregon	861,992	57,066	15
Washington	1,597,400	100,722	15
Connecticut	1,265,373	75,900	16
Idaho	445,176	27,810	16
Illinois	6,234,995	362,742	17
Utah	443,866	238,850	18
Vermont	364,946	19,765	18
Delaware	215,160	11,129	19
Maine	777,340	38,439	19
New Hampshire	444,429	21,230	20
Florida	916,185	42,846	21
Missouri	3,429,595	164,790	21
Maryland	1,373,673	61,102	22
Texas	4,515,423	198,369	22
Rhode Island	625,865	26,399	23
Massachusetts	3,775,973	156,798	24
New York	10,460,182	422,853	24
New Jersey	3,014,194	124,519	24
Oklahoma	2,289,855	91,700	24
New Mexico	423,649	15,745	26
Pennsylvania	8,660,042	324,184	26
Georgia	2,895,841	89,481	32
South Carolina	1,643,205	47,950	34
Virginia	2,213,025	65,000	34
North Carolina	2,434,381	61,946	39
Kentucky	2,394,093	57,543	41
West Virginia	1,412,602	34,371	41
Tennessee	2,304,629	51,900	44
Arkansas	1,766,343	39,000	46
Louisiana	1,856,954	37,600	49
Alabama	2,363,939	44,859	52
Mississippi	1,976,570	37,500	52
Total	103,640,473	5,466,931	..
Average for U. S.			22

Comment on Some Tractor Problems

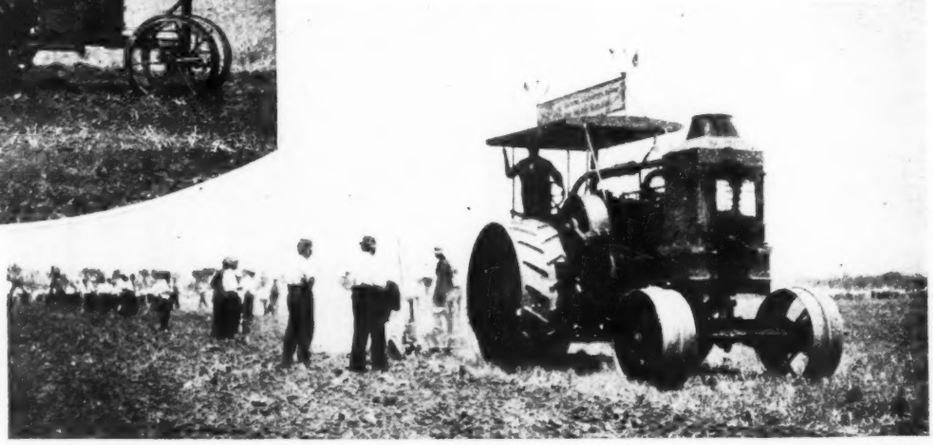
Tractors Shown at Salina Indicate New Tendencies in Design—Steering Gear a Weak Link—Seating Accommodation for Driver and Control Arrangement



Wallis tractor with boiler plate oil pan and gear housing also serving as frame

Port Huron three-plow tractor with Erd engine

Above — The small Avery with four-cylinder engine. On right—Rumely Oil-Pull hauling three groups of six disks each



A MEETING like that held at Salina recently affords many opportunities for a comparative study of design. It was the big event in the tractor world this year, and practically every concern that amounts to anything in the tractor industry was represented. In addition to the older models with 1918 improvements there were quite a number of entirely new designs. We show herewith a collection of photos taken on the field, which merit inspection by the tractor engineer and manufacturer.

As regards steering of the regular wheeled tractors, there are three different methods now in vogue. There is first the three-wheeled tractor with a single central steering wheel, which commends itself on account of its simplicity. While some of the most successful of the older types come under this heading, all of the new designs have four wheels. There is a possibility that the farmer looks upon the three-wheeled tractor much like the automobile prospect looked upon the three-wheeled motor car offered during the early years—as a makeshift and a freak. Of course, that the three-wheeler lost out in the automobile field is no proof that it does not possess merit as a tractor, but the great predominance of four-wheelers tends to confirm those who are prejudiced against the three-wheeler in their opinion, and adds to the sales resistance that must be overcome by the sponsors of the three-wheeler.

The Steering Problem

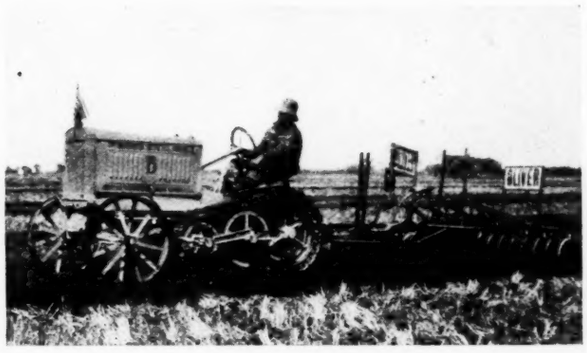
Some manufacturers have endeavored to secure the simple steering arrangement of the three-wheeler with the four-wheeled construction. They were evidently impressed with the advantages of the three-wheeler but wanted to reduce sales resistance. This led to the adoption of the construction employing two front wheels rather close together on a solid axle adapted to be rocked around a central vertical pivot.

Steering gears are evidently one of the weak points of the tractor. This may be partly accounted for on the ground that automobile steering gears, designed for

Emerson-Brantingham pulling three plows

Driver's stand on Parrett is used for women drivers

The new Avery pulling four plows



Bates steel mule hauling disk roller

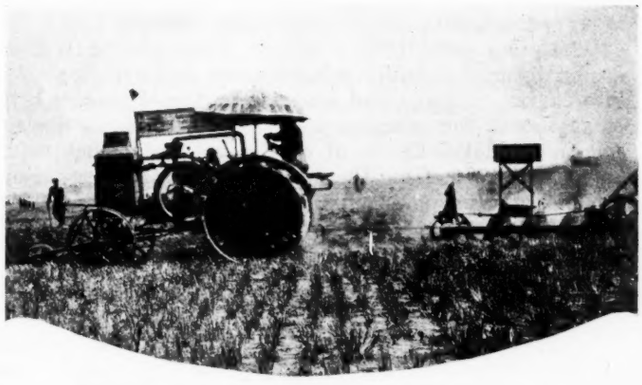
much lighter work, have been applied to tractors because they could be purchased advantageously. On the other hand, where tractor manufacturers make their steering gears themselves the design frequently has not received the attention it deserves. It is absolutely essential that a tractor steering gear be completely housed in, and the provisions for oiling its bearings and other wearing surfaces should be most carefully worked out. The chief cause of trouble with steering gears seems to have been due to the fact that often they are not sufficiently rugged to withstand the maximum strain rather than excessive wear, for in plowing, at least, the tractor is largely self-steering.

There is a tendency noticeable to approach the smooth outside lines which are so much appreciated in the passenger automobile. No one expects the tractor to serve as an ornament, but it is a fact that in the evolution of any machine the higher the state of perfection reached the more "sightly" or "attractive" the machine usually becomes.

Location of Driver

There is quite a variation also in the seating arrangements for the driver. Some designers place the driver in a comparatively high position, evidently with the object of enabling him to see the ground close in front of the tractor. The problem of seat location is, of course, closely related to that of control arrangement. Some day, no doubt, we will have standardized tractor control the same as we now have standardized control for passenger cars and motor trucks, but that day seems still a great ways off. All control devices should be arranged so that they can be conveniently operated from the driver's seat; it should not be necessary for the driver to go through contortions or acrobatics to change gear or apply the brake, but these functions should be capable

Plowman tractor hauling two plows



Rumely 12-24 tractor pulling four disk plows

Three sizes of Russell tractor in line

Fordson tractor pulling two plows

Converted Ford car pulling two plows, very shallow

Happy Farmer pulling four plows

of being performed in a natural, easy way. The demand for ease of operation will increase as the labor shortage becomes more acute and boys and women will largely have to operate the tractors.

Many of the tractors demonstrated at Salina were provided with cabs, and it is quite conceivable that when the temperature in the shade ranges between 100 and 110 degrees, or during a rain, they are quite a comfort, but under normal atmospheric conditions the average driver would probably prefer to sit out in the open.

Improvement of Details

In a tractor we cannot expect the finish and general finesse that we have become accustomed to in automobiles, yet it is evident that there is much need for improvement in design. Many tractors in the past have been built unduly heavy because the designers were under the impression that they needed weight for traction anyhow and there was no sense in cutting weight. However, the weight is only one of the factors determining the limiting traction and not all of the weight of the tractor is effective in increasing the traction. On the other hand, every pound of unnecessary weight that is lugged around means just so much waste of fuel.

What is needed is a thorough discussion of tractor design by men familiar with present day practice. An interchange of ideas and experiences would greatly help to accelerate the progress of this most essential device. The individual designer, of course, will gain much valuable information from the service department regarding weaknesses developing in the field, but an exchange of ideas and experiences among different designers would broaden the view of each.

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A FIRE-ALARM system, the detector part of which consists of a very fine copper tube cleated around through various parts of the building, is made by the Aero Fire Alarm Co., 26 Cortlandt Street, New York City. If a fire occurs, the air in the tube is heated, causing it to act on a diaphragm which connects an electric circuit and rings the alarm.

The Velie tractor

Hession tractor pulling three plows

Peoria 12-25 tractor with Climax engine

The S. E. 5A Single Seater Fighter

Mechanical Details of British Machine Which Has Been Adopted by Our Army Authorities Weighs 1554 Lb. Without Load and Is Equipped with 200 Hp. Hispano Engine

IN the Aug. 8 issue of AUTOMOTIVE INDUSTRIES we published a photograph of the British S.E.5A (Scouting Experimental) plane. Some further details are now available, a technical description of a captured machine having appeared in the German air-craft periodical *Luftwaffe* for March.

The machine described was built by Vickers, Ltd., and carried the number B-507, besides an A to designate the squadron it belonged to, as well as a white circle. The propeller was marked S. E. 5A, which suggests the idea that the machine is a development of the S. E. 5, which was fitted with a 150-hp. Hispano engine.

The wing surface is equal to 246 sq. ft., and both wings have a span of 26¾ ft. There is only a single interplane strut on each side of the body. The chord of the wings is 5 ft., and the gap from the top of the fuselage amounts to 1.65 ft. There is no sweep-back, but both the upper and lower wings have a dihedral angle of 1.71 degrees. Both sets of wings are of equal size, the upper set being mounted on the center section over the fuselage, and the lower set on to wing stubs. The field of vision is increased by cutting away a portion of the wing near the body. The upper wings have an angle of incidence of 5 deg. mean, while the lower wings have an angle of incidence of 6 deg. near the body and 5 deg. at the struts.

Both spars of the wings are of I section, while the spars of the wing stubs, which run through the fuselage, consist of 1¾-in. steel tubes, with a wall thickness of 0.169 in. There is nothing unusual in the design of the ribs, these being along conventional lines of British construction. There are no compression members or struts between the spars, but instead some of the ribs are of solid section between the spars. The internal wiring of the wings, between the fuselage and the struts, is of ordinary drawn wire, whereas the internal wiring of the overhanging portion of the wings is of swaged wire.

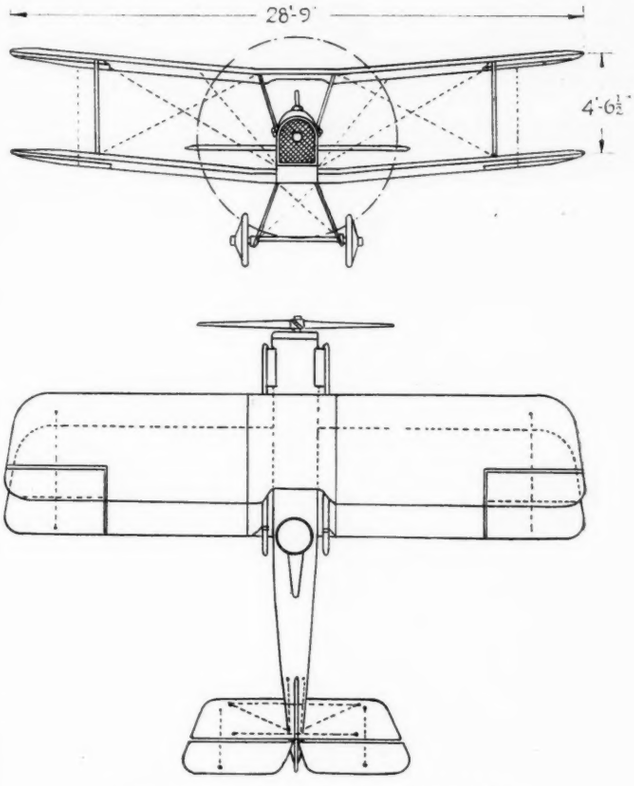
The trailing edge of the wings consists of a wood strip. Further, there are two auxiliary ribs between each pair of main ribs from the leading edge to the main spar. The fabric is sewed to the ribs, and is painted yellow on the under-surface of the wings, and brown above, as is the fabric of the fuselage. Grummets are put in place on the under side, near the trailing edge of the wings.

The center section struts are covered steel tubes. The spruce struts of the wings rest in long stampings, which serve also as attachment fittings for the vertical wiring. Stream line wire is employed for the plane cross wiring, with double wires for flying and single wires for landing. The two spars of the upper planes are strengthened between the center section and the struts by two wires each. Unbalanced ailerons are hinged to the rear crossbar of both upper and lower planes.

The body is of the usual strut and wire design, having semicircular frames and fairings on top, and three-ply wood planking of 0.16 in. thickness to the pilot's seat. Both the longerons and struts of the fuselage are of I-section, with the exception of the vertical struts behind the pilot's seat, which are of circular section.

The tail-plane is curved on both sides, and is fixed to the body in such a manner that the angle of incidence can be varied during flight, between the limits of plus 4.5 deg. and minus 3 deg. In order to make this possible, the front spar is made turnable, while the rear spar, with its wiring, is fixed to a tube, so arranged that it can be shifted relative to the stern post of the fuselage. This tube rests with a piece of thread in a gear nut, which latter in turn is supported by the stern post.

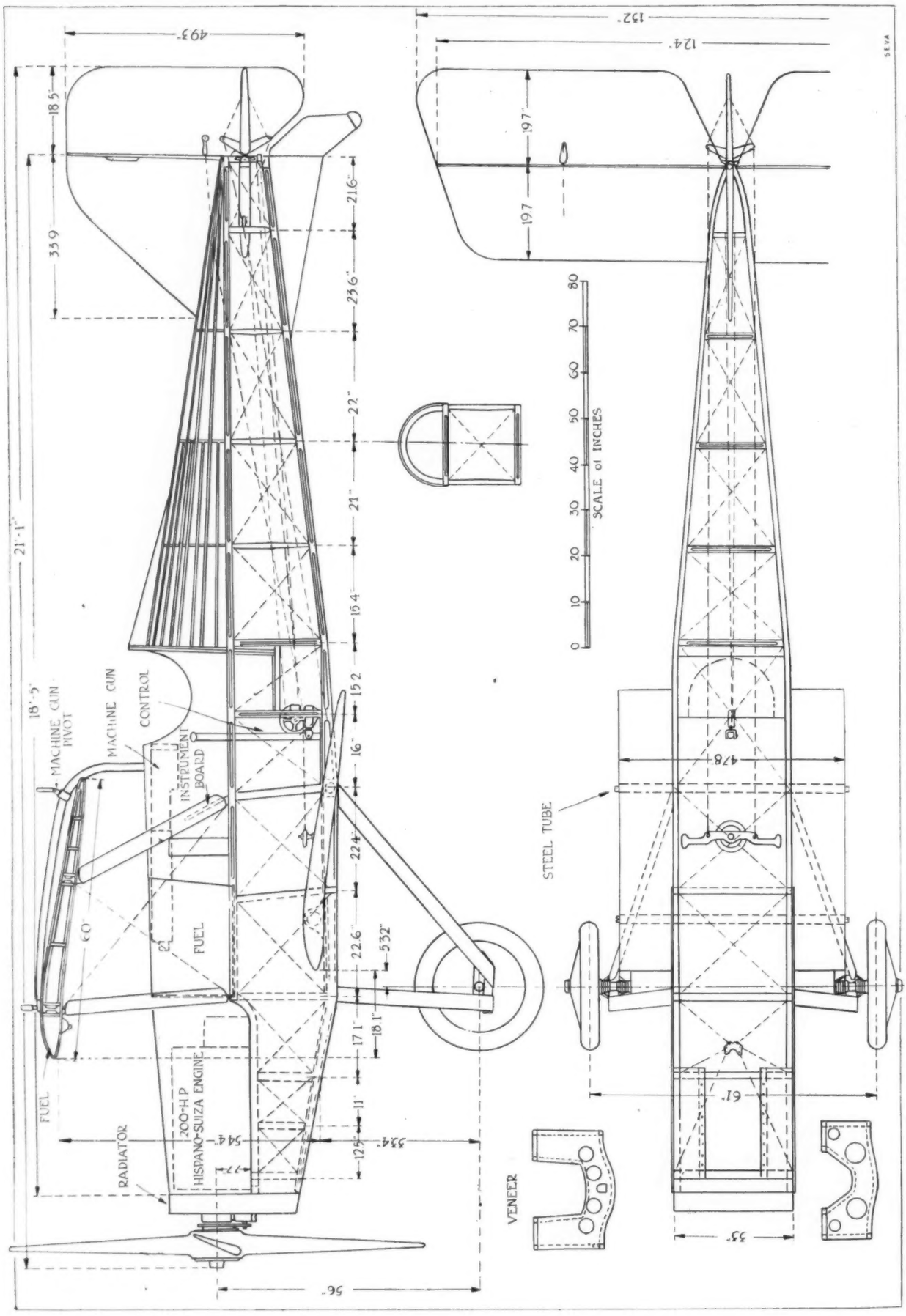
When the nut is turned from the pilot's seat by means



Front view and plan of S. E. 5A biplane

of a hand wheel and cable, the tube is displaced upwards and downwards, transmitting the same motion to the rear spar of the tail-plane, thus changing its angle of incidence. The elevator, which is hinged to the fixed tail-plane, takes part in this motion. The wires for operating the elevator are led through the fuselage and tail-plane, the obvious object being to reduce the air resistance. However, this arrangement necessitates two turns of 20 deg. in the wire. Both the main and the tail-plane are fitted with Cellon windows.

The landing gear is of conventional design. The one-piece axle rests between two auxiliary axles. There is no limit to the spring action. The tail-skid is somewhat unusual, in that it is arranged in a rotary manner be-



The S. E. 5A, adopted by the U. S. Army. The elevation shows the 18.1-in. positive lead of the planes. The overall length is 21 ft. 1 in. and the total weight is 1554 lb. without load

hind the stern post and is connected with the rudder cable through the intermediary of springs. A brass skid bow is sprung by means of two helical springs, which are prevented from side-wise motion by inserted telescope tubes.

According to the name plate, the Wolseley-Hispano-Suiza engine on August 30, 1917, delivered 206 hp. at 2005 r.p.m. A reduction gear, giving a speed reduction of 4 to 3, is used between the engine and the four-bladed propeller. The exhaust gas is connected through two exhaust pipes, one on either side of the body, to the rear of the pilot's seat. The engine is so arranged that it is readily accessible after the bonnet has been removed. The radiator forms the front of the fuselage.

Fuel Supply for Two Hours' Flying

The main fuel tank, having a capacity of 32 gallons, is placed behind the engine on the upper longeron of the fuselage. A gravity tank of 4.5-gal. capacity is arranged in the center section between the leading edge and the main spar. The oil tank, which has a capacity of 3¾ gal., is supported on the engine frame below the rear edge of the engine. The fuel supply carried is sufficient for about two-hours' flying.

Following is a list of the equipment carried in the pilot's compartment: To the right there are a box of light pistols, a switch for the self-starter, a switch for the two magnetos, a three-way valve for the two fuel tanks, a three-way valve for the hand and engine-driven air pump, a radiator thermometer, a fuel gage placed on the rear side of the main tank and a pressure gage to indicate the air pressure.

On the left are a gas lever, a lever for adjusting the fuel supply according to the altitude, a lever for operating the radiator shutters, and a clip for three light cartridges. Below there is a hand-pump for the hydraulic-machine-gun gear, and two boxes for drums for the movable machine-gun and self-starter.

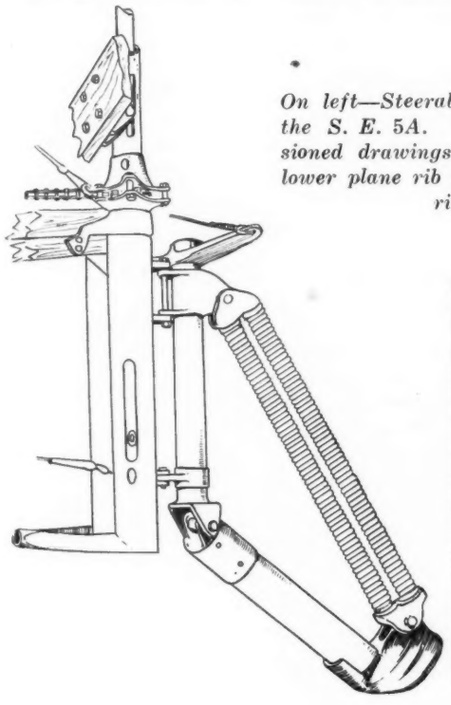
A square windshield of Triplex glass is placed in front of the pilot's seat. Behind this is a box which is accessible from the outside. The fixed Vickers machine-gun is located to the left of the pilot inside the fuselage, and its cartridge belt is of metallic construction. The machine gun is fired by means of a hydraulic mechanism. Connection is made to the engine at the forward end, the connecting means consisting of a copper pipe. There is also a drive through gearing from the propeller.

On the bow-shaped iron band, lying on the center section, rests a Lewis gun, which can be lowered during flight to permit of vertical firing.

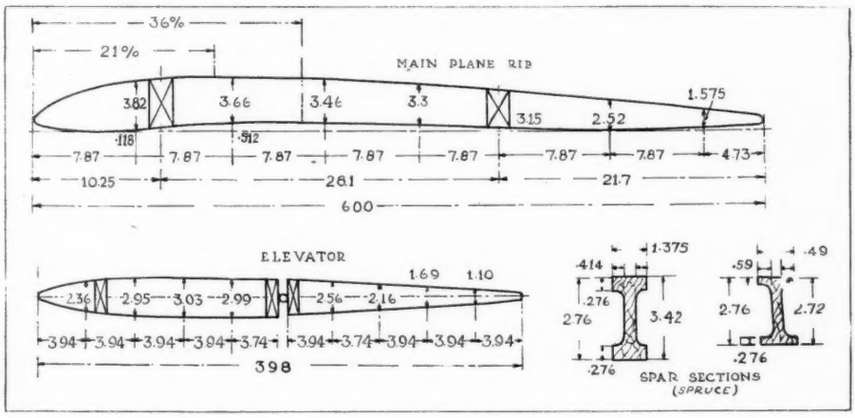
The weight of the machine without load amounts to 1554 lb., which is made up of the following items:

	Lb.
Engine	495.0
Exhaust system	26.6
Self-starter	8.0
Radiator	52.4
Cooling water	68.2
Propeller	58.5
Main fuel tank	39.1
Gravity fuel tank	14.3
Oil tank	8.6
Engine equipment	14.1
Body with seat and plate covers	332.0
Elevator control	4.2
Landing gear	90.0
Tail skid	8.1
Control gear	11.9
Planes with wiring	247.0
Wire bracing	46.2
Body equipment	30.8
Total	1554.0

When the tanks are completely filled the plane carries 244 lb. of fuel, so that the total useful load can be figured at 550 lb. and the total weight, loaded, of the plane at 2104 lb. The wing load is thus 2104 ÷ 246 = 8.55 lb. per square foot and the load in relation to horsepower 2104 ÷ 200 = 10.52 lb. per horsepower.



On left—Steerable tail skid of the S. E. 5A. Below—Dimensioned drawings of upper and lower plane rib and of elevator rib



Asbestos Production

DOMESTIC asbestos to the amount of 1683 short tons, valued at $506,056, was sold during 1917, according to the U. S. Geological Survey. This represented an increase of about 13 per cent in both quantity and value over 1916. Arizona produced the greater part of the domestic asbestos used. The proportion of crude spinning fiber to that of lower grades is much larger there than in Canada. As a result, the average price of American fiber in 1917 was $301 a ton, while the average price of that produced in Canada was only $50 per ton.

The impression which has been prevalent for some time that the Arizona fiber contains less iron than that obtained in Canada has recently been confirmed by an analysis made by R. E. Zimmerman, of Pittsburgh. Mr. Zimmerman's investigation also indicates that thin films of calcite among the fibers cause the harshness of certain parts of the asbestos from Arizona.

Selection, Training and Supervision of Women Workers

More Than 600 Carefully Chosen Female Operatives Now Employed at Nordyke & Marmon Plant—How High Employment Standards Are Maintained—Training Methods

AFTER six months' experience with women on extremely varied kinds of work and many different operations in its production departments, the Nordyke & Marmon Co. of Indianapolis has arrived at the conclusion that there are many advantages to be derived from the employment of women by manufacturing establishments.

It seems to be the unanimous opinion of the various superintendents, foremen, female supervisors and officials of the company, so far as conclusions can be formed on the data available, that for one thing it is easier to break in women as beginners; that is, that they learn more rapidly than the grade of men now available. But in weighing this conclusion one must keep in mind that the company has made it a point to employ only women who are distinctly above the average of female factory workers.

The Nordyke & Marmon Co., when it turned its attention to female labor in the great emergency, started out with the purpose of employing only those who measured up to certain high standards, physical, intellectual and moral. Women employees were carefully selected from applicants, and it is the belief of the examining physicians and others who had charge of the work of selection that the average of the women employed was unusually high.

More Than 600 Women Now Employed

Women between the ages of 20 and 40 are employed throughout the plant in all three of its main divisions; the automobile, aviation engine and flour mill divisions. The only variation made from these age limits is in the case of mail carriers, for which positions girls of 18 years and up are taken on. More than 600 women are now employed throughout the plant, and it is believed, because of the requirements of Government work, that this number will be materially increased shortly, the expectation being that eventually, and it might be said, as soon as possible, the company will have about 1000 women on its pay-roll.

In the selection of women employees, while mental and moral characteristics are given careful consideration, the physical standard set for successful applicants may be said to be the controlling one. Each applicant is thoroughly examined by the plant physician. The examination covers the following points: Height, weight, eyesight, hearing, color perception, rate of pulse, respiration, evidence of incurable diseases, and immoderate use of stimulants, evidence of abdominal diseases, scars, deformities, examination of the nose, mouth, teeth, tonsils, throat, palate and tongue, mentality, general physical condition and personal appearance.

The high standards are maintained after employment by careful supervision, directed by the company's superintendent of women and a staff of supervisors. Another

Departments in the Nordyke & Marmon Plant in Which Women Are Employed

Tool crib
Rocker arm
Cylinder
Miscellaneous Aluminum
Miscellaneous Steel
Connecting-Rods
Welding
Crankcase

In all of these departments Government work is being performed.

What Women Are Doing in the Nordyke & Marmon Plant

AUTOMOBILE DIVISION

Operating:
- *Hand milling machines.*
- *Drill presses.*
- *Grinders.*
- *Sewing machines.*

Inspecting.
Assembling light parts.

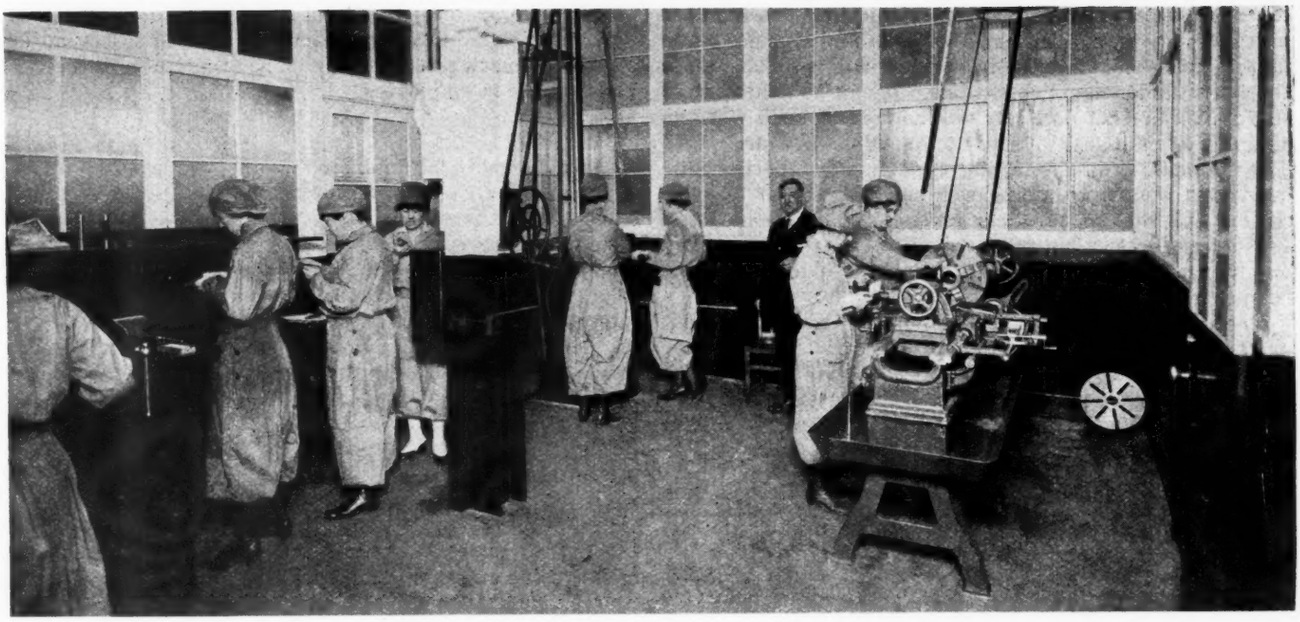
AVIATION ENGINE DIVISION

Operating:
- *Small drill presses.*
- *Speed lathes.*
- *Milling machines.*
- *Grinders.*
- *Profile machines.*

Welding: acetylene and arc.
Scraping small aluminum parts and crankcases.
Inspecting engine parts received from outside.

GENERAL

Floor sweeping (by colored women).
Laundry work (on women's factory suits)
Shipping.
Time-keeping.
Messenger service.
Clerical work in production departments.



In the training room for women at the Nordyke & Marmon plant all applicants are given sufficient instruction to acquaint them in a general way with the machines they will operate and to overcome "stage fright" usually experienced by beginners plunged immediately into the production department

contributing factor to the maintenance of the high standards of employment is that every effort is made to make the plant attractive to the better class of women and the girls and to provide the best of working conditions. As the superintendent of women points out, the female employees find new, modern factory buildings with good light and ventilation, good discipline, a clean, moral atmosphere, rest rooms equipped with comfortable chairs, lounges, magazines, piano, etc., dressing rooms, adequate safety devices for all hazardous work, first aid equipment, good restaurant facilities and supervision administered in a protecting, helpful and kindly spirit.

Undoubtedly another factor which conduces to the maintenance of a high standard is the payment of a very fair compensation for services. Beginners receive 22½ cents per hour for 8½ hours per day, 5½ days per week, and are paid time and one-half for overtime and double time for Sunday and holiday work.

Hours and Wages

The average female employee works from four to six weeks at this rate of pay. Piece work rates offer the opportunity to earn from $15 to $25 per week. In departments where piece work is not practicable and it therefore becomes necessary to work on a straight hour basis, the company has, in several instances, increased the rate of pay without waiting for requests from those women who have shown themselves capable of getting ahead and of producing at a higher rate.

About 75 per cent of the women who have been employed so far by the Nordyke & Marmon Co. have completed at least the common school grades, and many of them have been through high school. Some are college women. It is the belief at the plant that the capacity of these women to learn is increased by the intense interest which they take in their work and the patriotic desire to serve their country at this particular time. Many of the women employed have husbands, brothers or other relatives fighting at the front.

It was found in the welding department that women did not pick up the intricacies of the job as quickly as men, but the slowness in learning in this case is more than offset, according to the foreman of the department, by the fact that many of the women become eventually better welders than the men. They make better looking welds and apply themselves more thoroughly to the work. It has been found necessary to explain the operation of welding more frequently to women than to men, which is accounted for possibly by the fact that the average man has had more experience in similar work. So far, women in the welding department have not developed the capacity of men to turn out a quantity of work, but it is not felt that conditions have been right so far for a fair and sufficient test.

What the Company's Experience Indicates

Other indications which have been observed in this particular organization are:

That among women employees a larger percentage make good after their original employment than among men employees. (For example, the foreman of the connecting-rod department has put himself on record to the effect that out of 30 women, who have been tried out, he has been obliged to reject only five as unfit for the work.)

That women make better inspectors than men when employed in inspecting small parts.

That women spoil less stock than men, thereby materially reducing the loss by scrap. (It has been found that after the first three or four days most women operators spoil very little stock.)

That women are more inclined to stick to their jobs closely and are more attentive than men.

That they are willing and glad to work overtime.

That the attendance of women is extremely good and cases of tardiness are infrequent.

That women maintain better discipline than men, owing probably to the novelty of their employment and their desire to learn a new vocation. (It is admitted that conditions in this regard may change as the women become better acquainted with their surroundings.)

That with equal experience, women are better at clerical work than men.

That there is little if any difference in the output capacities of men and women. (Several of the foremen at

the Nordyke & Marmon plant have said that they can see no difference in the capacities of men and women, while others hold that eventually women will produce more than men under equal conditions. It can be said that so far women are not doing as well as men on such work as scraping crankcases, which is unquestionably hard work. The foreman of the scraping department reports, however, that women are doing well on light work.)

That the rate of turnover among women seems to be considerably less than that among men. (The company admits that sufficient data are not yet available for a comprehensive analysis.)

That the physical limitations of women is the only marked disadvantage and that apparently these limitations will confine them chiefly to the lighter kinds of work. (The company believes that the larger number of women cannot be given heavy work and that this kind of work must continue to be done by men.)

Employment Records

The following table, taken from the records of the employment department, is correct as of August 3:

Total number of women applicants	3769
Total number of women examined by physician, about	1589
Total number of applicants rejected on examination, about	304
Total number of women actually working Aug. 3	661
Total number who have quit since March 11	275
Total number of women hired (the sum of the foregoing two items)	936

Supervision

The organization in charge of the women working in the Nordyke & Marmon plant comprises one superintendent of women, who has as assistants one supervisor of employment and eight supervisors of factory workers. The maintenance of discipline and a proper moral standard is the chief duty of the shop supervisors. These supervisors also see that the operators are continually supplied with stock, that their machines are kept in proper operating order, and they communicate to the proper authorities all complaints of women operators bearing on alleged unfair time studies upon which piece work rates are based. These supervisors do not instruct operators nor do they personally provide stock or adjust or repair machines, but they do see that these things are done by male employees.

Uniforms

The company has adopted a uniform system for all female operatives, the suits being made in four styles, each style indicating a rank or kind of employment, as follows: Supervisors and forewomen wear plain blue; machine operators, blue and white stripes; inspectors, blue and white checks; stenographers, clerks, timekeepers, brown and white checks.

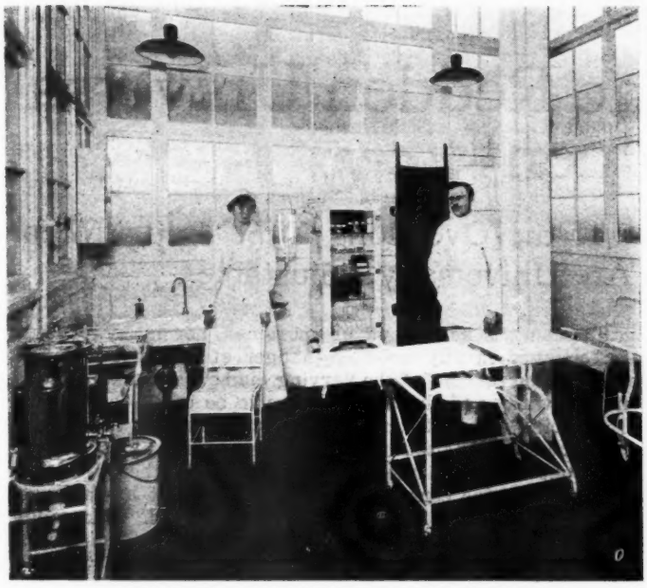
The regulation costume consists of blouse and bloomers, buttoned at the waist. The company provides these costumes and they are sold to the women at $2.75 per suit, to be paid for at the rate of 50 cents per week. A "Liberty Laundry" is operated by the company, and in it these costumes are washed weekly free of charge.

The Training School

For the instruction of women applicants for employment in the aviation engine division, a preparatory school was established on March 25, 1918. Before this school was inaugurated, women had been employed at the plant for a short time and an experiment in instruction had been made which did not turn out satisfactorily. The plan was to make use of the Manual Training High School in Indianapolis and to have the women supervisors and operators receive instruction there in night courses. But after three or four nights the idea was given up owing to the fact that neither the applicants themselves nor the requirements of the company were satisfied.

After this, a schoolroom was established in the aviation engine factory, adjacent to the women's rest room and as near as possible to the office of the superintendent of women. A room, 12 x 24 ft., was used. In charge of the instruction was placed a competent and conscientious man who has the faculty of imparting knowledge and of creating a keen interest in their work on the part of women who apply for positions. He had had no actual teaching experience but was endowed with natural ability and had some experience as a director of work done by women factory workers. Besides this he had a general

The rest rooms, equipped with comfortable chairs, lounges, magazines, pianos and other recreational agencies, are by no means the least factors which conduce to the maintenance of a high standard of quality among the company's women employees



A completely equipped first aid room at the Nordyke & Marmon plant

shop experience extending over a quarter of a century, during a large part of which he had charge of women workers.

The equipment of the schoolroom consists of one upright drill press, one milling machine (hand), one power lathe and the following small tools: micrometers, inside and outside calipers, thread gages, ring gages, plug gages, dies, drills, reamers, wrenches, files, etc.

Method of Instruction

In the training classes a distinction is made as between those who are to become inspectors and those who are to be turned into machine operators. All applicants are, however, instructed in the elementary principles of the use of equipment and tools. Welding is not taught in this school, as it has been found that this can be done best in the welding department, and it is there done under the direction of a special male instructor provided by the manufacturer of the welding equipment used.

Except those applicants detailed to the welding department, all who enter the employ of the Nordyke & Marmon Co. receive instruction in the schoolroom for from three to four hours in the morning of the first day of their employment. They are instructed, each for one continuous period and in groups or classes of from four to ten, according to daily conditions and requirements.

It has apparently been established that this amount of preliminary instruction is sufficient for beginners of average intelligence, provided they have had a reasonable amount of mathematical training. Perhaps the chief benefit derived from this training, at least the effect which is most immediately noticeable, is the elimination of nervousness or "stage fright" experienced by nearly all beginners. This in itself is really worth while, as it has been found in shops which use the shop training method that much valuable time is lost and much good material is destroyed as a result of this "stage fright." Getting acquainted as she does with the calipers, micrometers and other tools, and learning something about what may be expected to happen when she does this, that or the other thing, to a lathe or drill press, tends to put the new employee much more at ease during her first experience in the production department.

It is, of course, quite impossible to give applicants a very extensive or prolonged training in such a short time, but the sole object is to instil in them a perception of the simple principles governing the use of small tools and the operation of the simpler forms of machines. It is the experience of the Nordyke & Marmon Co. that this amount of instruction is sufficient to give the student a good beginning on simple operations in the factory and after it she learns rapidly, becoming her own instructor, as it were.

Training Follow-up

The small tools needed for the equipment of each operative are furnished by the company and sold to them at the rate of 50 cents per week.

After passing through the training department or school, the women are assigned to work in the plant on the same day that they begin their connection as employees of the company. They are visited by the instructor for additional instruction and for the purpose of determining whether or not they are making the headway which they should. From time to time they return to the school to be reviewed and to have errors corrected.

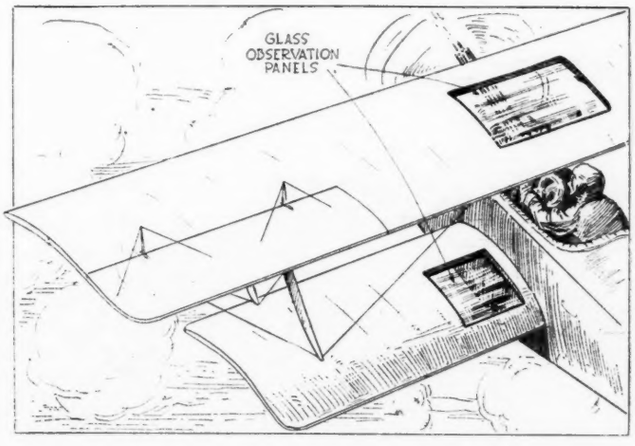
It has been found that practically all of the women employed learn very rapidly; in fact, up to a recent date only two out of the many hundreds taken on had given up through discouragement or inability to learn, and they were assigned to other kinds of work where the use of tools was not required.

Fitting the Woman to the Job

An effort is always made where dissatisfaction is manifested to keep employees from leaving the company, and frequently women are changed from one operation to another in an effort to find work more congenial to them. They are moved from one kind of machine to another and from one department to another. It is sometimes necessary to make three or four transfers before the kind of work for which a woman is best fitted is discovered.

It should be emphasized in closing that the Nordyke & Marmon Co. realizes that its experience with women operatives is not sufficiently extensive as yet to permit of the formation of definite conclusions. What has been written here is to be taken as a record of what has been done by the company and a statement of what this experience indicates.

Eliminating Blind Spots in Airplanes



Transparent sections in upper and lower wings prevent interruption of vision by structural portions of plane. These are non-breakable glass panels formed to follow the streamline shape of the wings and allow the pilot to look directly overhead and downward on either side of the fuselage

Technical Details of the Redden Universal Attachment

Designed to Convert Any Passenger Car of the Overslung Type Into a Motor Truck—All Fittings Required Are Universally Adjustable

IN converting a passenger car into a motor truck, there are required an extension of the frame, a new rear axle, and means for transmitting the power from the rear axle of the passenger car to the equipment axle. Reference was made in the news columns of a recent issue of AUTOMOTIVE INDUSTRIES to a new universal attachment placed on the market by the Redden Motor Truck Co. of Chicago, and we are now in position to give some technical details of this attachment.

Fig. 1 illustrates the frame extension. The side members of the passenger car frame extend backward to a cross member of the attachment frame, the rear ends of the former being secured to the latter by means of bolts or rivets. The side members of the Universal Attachment are bent inward at a slight angle, at their forward end, and are secured to the side members of the passenger car frame by means of steel bars which are bolted to the passenger car frame and provisionally secured to the Universal Attachment by means of "U" bolts. These "U" bolts, however, are used only to hold the parts together while they are being drilled for rivets. By moving the attachment frame member farther out along the connecting bar, the frame extension can be fitted to passenger car frames of different widths, thus making the frame extension universal.

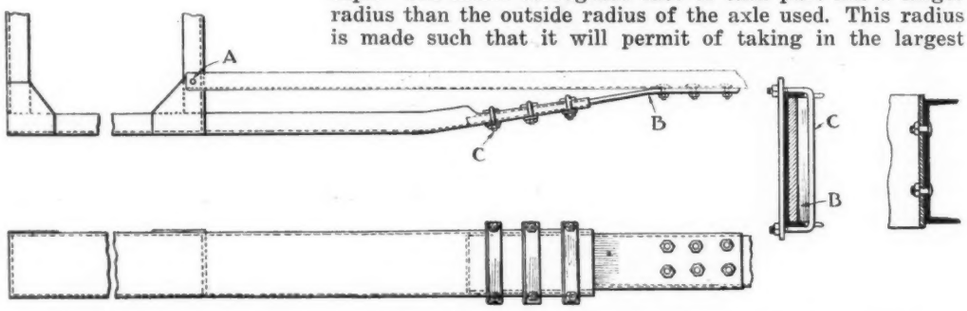


Fig. 1—Frame extension. A, bolt joining rear end of car frame to cross member of extension; B, extension bar; C, U-bolt

Another part of the Redden equipment is a universal axle hanger. This is used to clasp the passenger car axle housing firmly when it is used as a jackshaft. The passenger car axle housing is not cut off or shortened, nor is its construction changed in any way. A hanger of the type shown is necessary on account of the varying diameters of axle housing and the variety of shapes that have to be taken care of.

Referring to Fig. 2, showing a section through the hanger, it will be seen that the latter comprises a hub made of three parts, one being the hanger proper, and the other two being caps. The inside corrugated face of each part has a larger radius than the outside radius of the axle used. This radius is made such that it will permit of taking in the largest diameter of passenger axle housing in actual use. The axle housing is always clasped at three points as shown. The caps are firmly held to the bracket and each other by means of bolts passing through lugs. On the bracket are two lugs designed to take the forward end of the radius rod. It will be readily seen that by separating the caps an equal distance from the hanger and from each other, a larger size of axle housing can be clamped in place. Herein lies the universal feature of the hanger.

No change is made in the passenger car axle driving shaft, and, in fact, its hub is left intact. It is necessary,

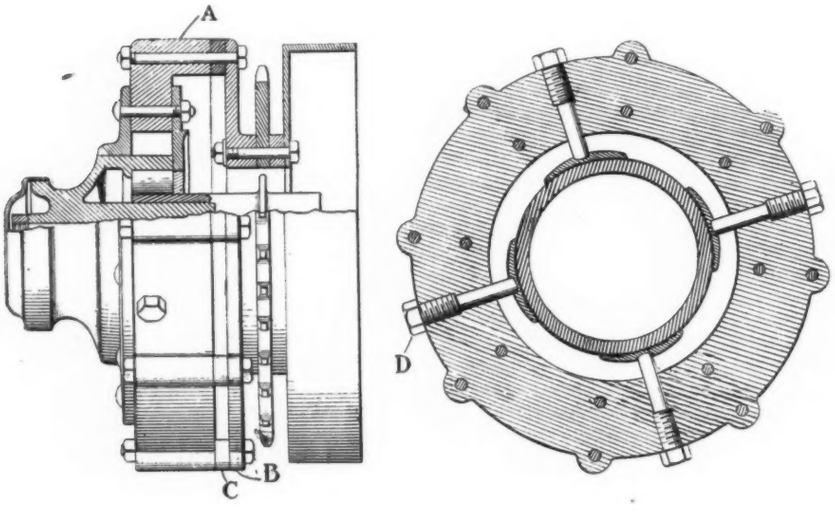


Fig. 3—Attachment of sprocket wheel and brake drum

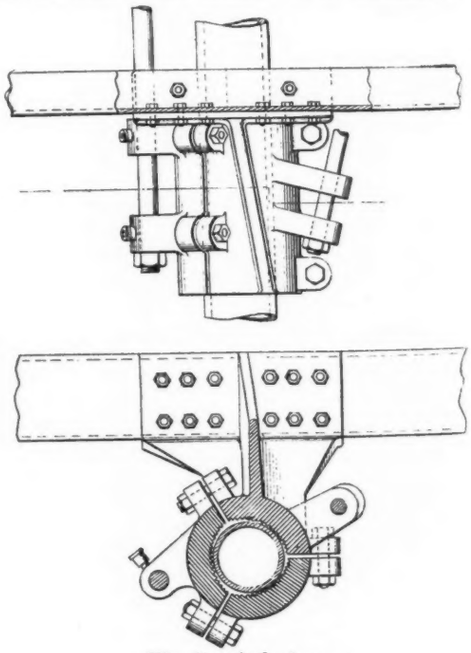


Fig. 2—Axle hanger

however, to remove the wheel proper with the spokes from the hub and substitute in its place what is known as a spoke replacement flange, as shown at *A* in Fig. 3. This is clamped in place by means of the hub bolts. It is held firmly by the hub flanges, and in turn supports the jackshaft sprocket flange *B*. This latter is accurately placed in an axial direction by means of varying thickness of washers *C*. The jackshaft sprocket flange, by means of attaching bolts, carries the jackshaft sprocket and the service brake drum. All of these members form a compact bellhousing or exterior hub. From this hub the power is transmitted to the rear wheel by means of a driving chain.

It is realized that it will be necessary to fit different types of hub barrels, and some means of universal adaptation must be made. This is taken care of by means of the adjustment bolts *DD* which force a steel jaw radially against the hub, clasping it at four points, regardless of the diameter.

The three parts described, viz., the frame extension, the axle hanger and the jackshaft sprocket flange housing, are the three main universal parts of the Redden Universal attachment. They permit of fitting the attachment to any make of passenger car, with the exception of the underslung type.

In the design of the Redden trailer an attempt has been made to reduce the weight to a minimum consistent with reliable service. The same type of axle is used as in the Universal attachment. Each set of wheels, front and rear, carries a sub-frame, and the main frame is attached to the sub-frames by means of a king bolt. Each pair of wheels possesses a fifth wheel, allowing both front and rear axles to turn. The two sub-frames are connected to each other by means of a cross bar arrangement which gives to both the same turning radius. These cross bars are in the form of a turn buckle, permitting of adjustment to insure the proper tracking of front and rear wheels. Very strong spring shackle bolts and spring shackle rods are provided.

The sub-frame is composed of 2½ by 4 in. pressed steel channels, put together with double gusset plates and three cross members. The fifth wheels rest on rollers attached to the sub-frame, making them easy turning.

Wheels are fitted with roller bearings. They are of the artillery type and equipped with S. A. E. Standard solid tires 34 by 3½ in. in size. The drawbar is directly attached to the axle, and the trailer is reversible.

The main frame consists of heavy pressed steel channels, held together by 6 cross members. The entire equipment is capable of carrying a safe load of 4000 lb.

An Effective Safety Display

A NOVEL way of keeping before the men in the shop the idea of safety is being employed by the Willys-Overland, Inc., Toledo. A large, movable display board is placed in each department alternately in such a position as to be before the men whenever they come to and go from work.

This board, measuring about 7 ft. in height and 5 ft. in width, has mounted upon its black background scores of sample tools—those which have been used so long as to be considered unsafe and should be discarded, and the new tools which should replace them. The hazards with the use of poor tools are many, and it is the aim of this bulletin board to point out to the workers the chances they are taking through the use of tools other than those recommended by the company.

Use of Each Tool Described

Under each specimen tool is a card either stating what results may follow the use of the tool and recommending the use of another tool, or giving statistical data relative to accidents occurring throughout the factory following the wilful use of such improper tools. The following are interesting excerpts:

725 *days lost because of tools slipping from heads of bolts, nuts, screws, etc.*

1013 *days lost because of flying particles. Wear goggles.*

87 *days lost because of flying chips cutting with simple tools.*

178 *days lost because of ladders slipping.*

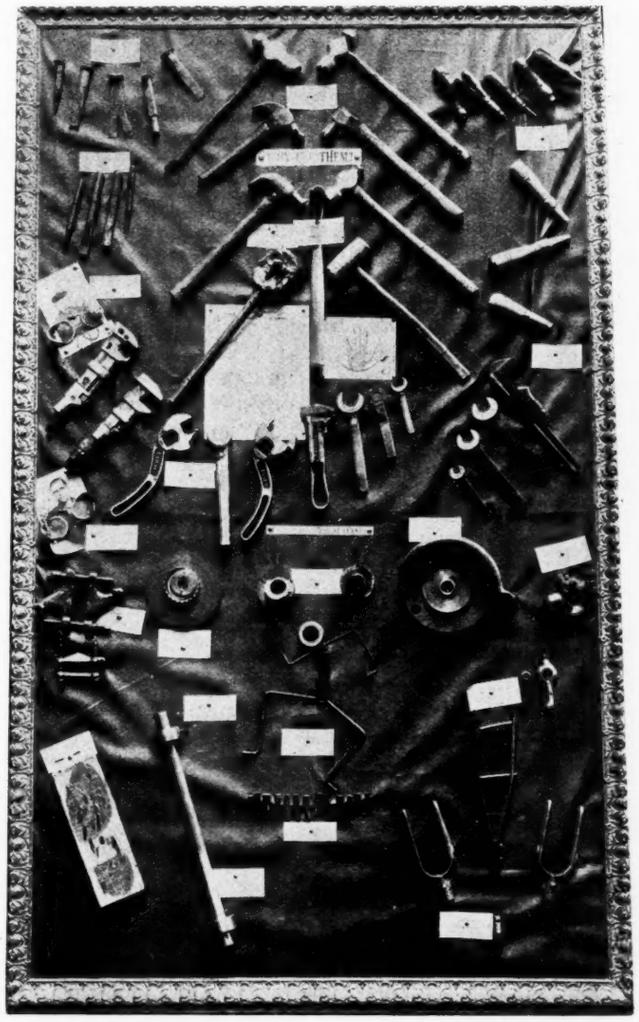
100 *days lost due to simple tool accidents of various kinds.*

328 *days lost because of glancing blows from hammers.*

1068 *days lost due to flying objects from glancing blows of hammers.*

Turn down nails. It is a dangerous practice to allow boards to lie around with the points of nails upturned, ready to pierce some one's foot.

The board stays in each department about 2 weeks, and it will take about 2 months for it to complete visits to all the factory departments. Another board is being prepared. It will be entirely different. It will have statistics and pictures showing the results that follow failure to report small or minor injuries. The company desires to emphasize the fact to the workmen that all injuries, no matter how insignificant they may seem, should be reported immediately.



Safety display board which is set up in the various departments of the Willys-Overland Co. to warn operatives against the use of poor tools

The Problems of Aerial Bombing

Details of Bombs, Bombing and Bomb Carrying—The Difficulties of Aerial Navigation and Night Flying as Set Forth by British Army Experts

DURING a recent week the British Royal Flying Forces dropped over 3000 tons of bombs on German cities and fortifications. This is more than was used in any like period previously by any two of the warring countries. Night bombing by airplane is receiving growing recognition as the probable road to victory. Consequently the science of bombing and night flying is receiving much consideration and the problems and activities are given publicity in the effort to secure the utmost efficiency. The following descriptions of the bombs used and the difficulties of night bombing were secured from British officials in this country who speak from personal experiences.

Bombing has been used for war purposes since 1912 when Italy dropped bombs during the Tripoli campaign, but it was not until the present war had been in progress for two years that bombing attained any high degree of perfection. In the first years of the war pilots were frightened when ordered to take up a bomb and did so only under extreme pressure.

Each nation has developed its own types of bombs. The actual shapes differ, but the general idea is similar, being a pear-shaped bomb with wings on the stem end. The wings prevent the bombs from falling heels over head in the air, insure correct aim and explosion when they "strike." The "skin" of the pear, as it is called by the British flying officers, is usually made of steel, which is best, but in some instances is constructed of cast iron. The "flesh" is a high explosive, such as T. N. T. or amatol, or one of their derivatives. The "core" is known as the exploder or detonator. The "stalk" and the remainder of the pear at the bottom are the fuses on which depends the explosion.

How Bombs Are Used

Bombs are used for two purposes, to attack the enemy troops in the open or under light cover as in billets, and to destroy supply stores, factories, ammunition dumps or cities behind the lines. Small bombs are used for the first. They are about 20 pounds in weight, have a case ½ inch thick and when exploded burst into thousands of fragments about ¼ inch to ½ inch square each, which fly out in all directions. Another bomb sometimes used for this work weighs 112 pounds. It is not as efficient. The British forces using the small bomb did remarkable execution against the Germans in the drive in March of this year.

Bombs weighing 230 pounds and 500 pounds are being used for the destruction of cities, factories and supply stores. Larger ones are expected to be developed in the near future as the carrying power of raiding machines increases. The big bombs are also used by flying boats against submarines, and for this work are so made that they explode well under the surface of the sea.

The large bombs used for attacking towns are constructed with thick cases so that heavy fragments of the metal are hurled and create considerable damage. These bombs carry two fuses, a nose fuse and a tail fuse, and can be made to explode by either at the will of the pilot. The nose fuse bursts the bomb on percussion—at the time it hits the ground or any other hard object. The tail fuse is so arranged that it can be set to explode the bomb not immediately as it strikes, but after it has penetrated some distance. For example, when bombing railroads or a building containing ammunition the pilot desires to have the bomb penetrate before bursting. By exploding after the bomb has penetrated the ground for 4 or 5 feet below the surface of a railroad track it insures a deep crater and more extensive destruction.

Carrying Bombs on Airplanes

The carrying of the bombs has developed considerably from the early days when the bombs were tied on to an airplane anywhere by means of wire, which was cut at the critical moment with a pair of pliers. Special racks were designed in the first years attached to the bottom of the fuselage or beneath the planes, which made possible the accurate sighting and simplified the release of the bomb. With the development of machines of greater lifting power the bombs were hung up by their noses inside of the planes, from which position they are released automatically as the bomb sight swings over the objective.

Bomb sights are not yet near perfection. The difficulties encountered with them may be explained by comparison of their use with machine gun aiming. The machine gun provides a fixed point from which the pilot shoots at moving objects. But the bomb, moving along as fast as the machine is, must be released before the plane is over the target. This makes the speed of the airplane an important factor. In addition, the speed of the wind is very important and difficult to gage and further, unless the airplane is flying on an absolutely level keel, the pilot is unable to know what point is vertically below him, and is not certain when he is over the target.

Bombing of cities, factories, supply stores and ammunition dumps is best accomplished at night, because the bombing planes are comparatively slow in flight and by day offer good targets both to anti-aircraft guns and enemy fighting planes.

The Problems of Aerial Navigation

As a rule when a squadron leaves its aerodrome it circles around until it attains 15,000 feet, which is the usual cruising height. They then proceed at about 90 miles per hour toward the objective, which may be 200 miles distant, and must maintain their course despite darkness, varying winds, clouds, fogs or anti-aircraft barrages. This involves problems of navigation and difficulties of navigation form one of the most serious obstacles to effective night bombing. For comparison consider the navigation of a ship across the ocean at 20 knots with currents of 5 knots carrying the ship off the course. This is an extremely difficult situation, but is simple in contrast to the complications of successfully piloting an airplane at 90 m.p.h. with wind currents at 25 to 30 m.p.h. and varying at different heights.

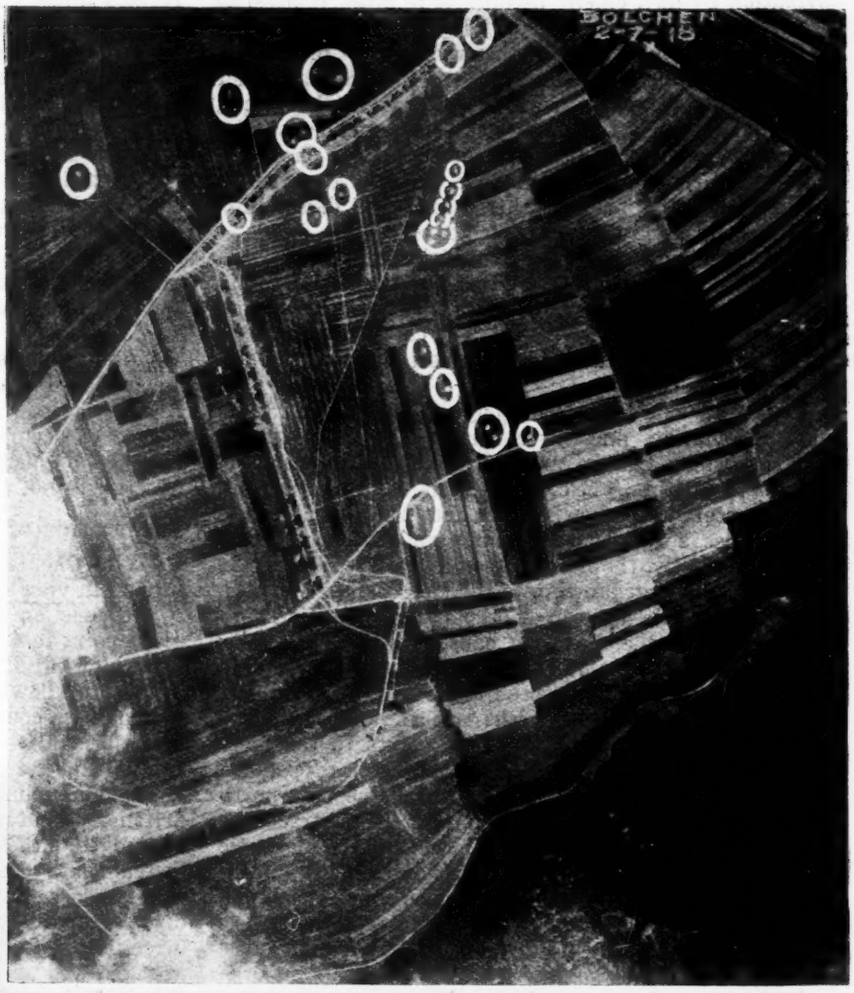
Navigation by night is considerably more difficult than

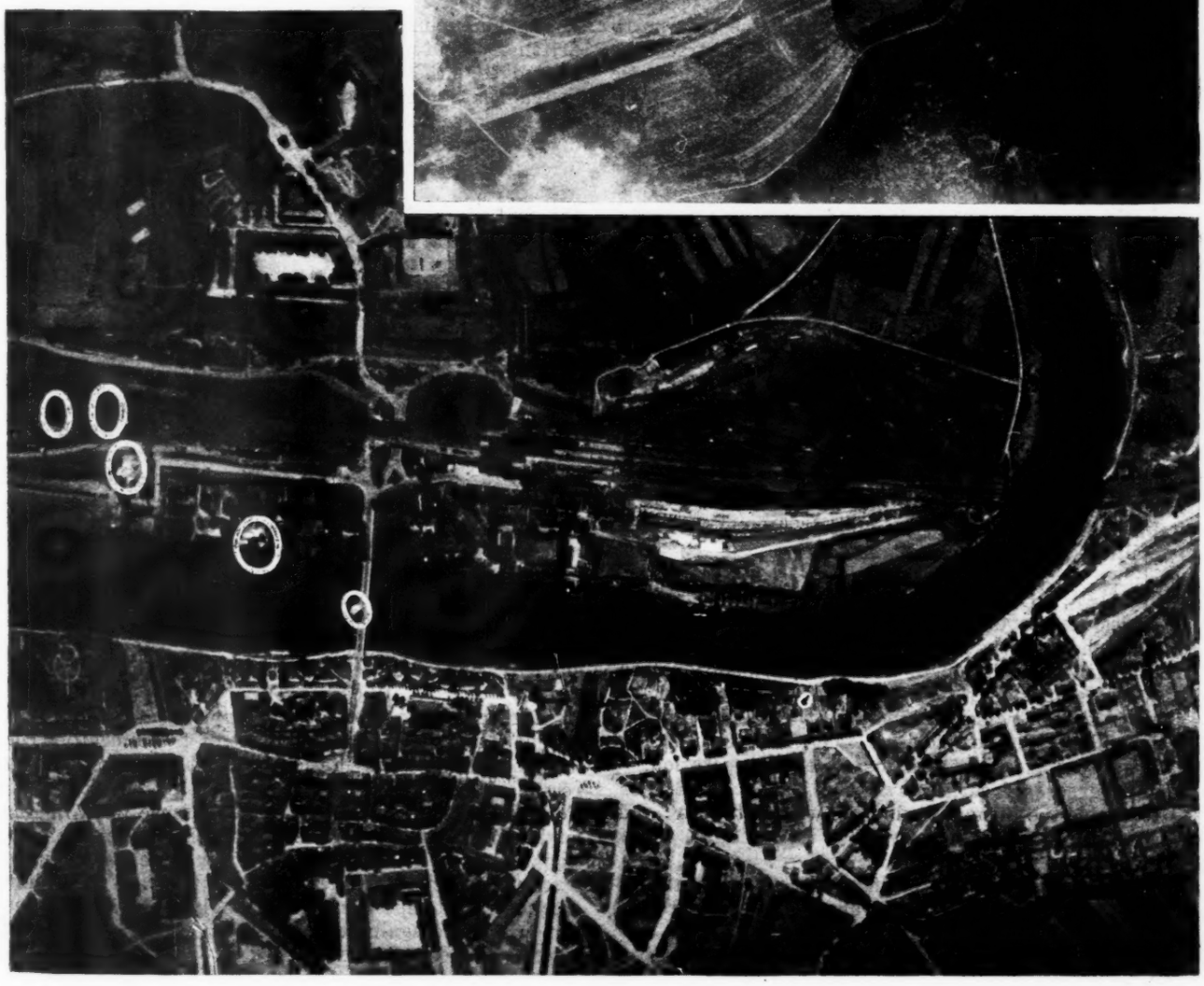
Photographic Records of Bombing Results and Guides for Future Bombing

Photographs like these are used by night bombing squadrons, together with maps, to determine objectives. They are the products of the double operation of bombing and reconnaissance.

At right—A bombing raid by one airplane on the Bolchen aerodrome. Three or four hangars were badly damaged by direct hits and holes were torn across the landing field.

Below—Bombing of Thionville, with hits on railways, railway building and a bridge. The bridge hit is exceptional and shows exceedingly good marksmanship.





navigation by day, chiefly because it is often impossible for the pilot to see the ground. The Germans when raiding London, always choose nights with bright moonlight, when the ground features can be seen in outline. Under the moonlight, woods and forests appear as black patches, rivers and lakes show as silver colored threads or patches. These help, when they are frequent enough, to check the direction of the flight. Otherwise, without the ground features, the pilot has only his compass to direct him, and the compass is not yet perfected.

After considerable study of aerial navigation, from 1911 to the present time, a British naval officer, Captain Creagh Osborne, has developed this division of air flying to a comparatively high degree. The compass is affected by the steel and iron used in the construction of the airplane or in its cargo.

The errors caused by the weight and the metal are termed "deviation" and this is corrected, so far as possible, by specially trained men, with the aid of magnets, prior to the flights. Excellent examples of the difficulties encountered are shown in the fact that when an airplane carries a full load of bombs and the compass is adjusted correctly, the needle becomes incorrect when the bombs are discharged, owing to the iron casings on them. This makes the return trip of a bombing expedition very difficult. Again the deviation caused by the proximity of a machine gun can be corrected but will again be in evidence after the gun has been fired.

The compass, of course, does not show the true or geographic North Pole, but instead points to the magnetic North Pole located in the regions north of Canada. Consequently, the pilot using a map and the true north must estimate the variation and add or subtract the angle between the directions of the true and the magnetic poles in his calculations. This variation changes according to geographical positions and calculation on a long flight of 500 to 1000 miles must be made several times. Thus, before making a long distance flight the pilot takes his true course from the map. He converts this into the magnetic course by estimating and applying the variations, then calculates the wind drift and then applies the deviation. This gives him the direction in which to fly by compass to gain his objective. With all these calculations he must still continue to change his course as the wind changes in strength and direction, and must from time to time check his position by taking observations of visible points on the ground, such as the lights of distant cities. Despite all of these difficulties and obstacles, night raids are being carried on in radii of 200 miles with practically little trouble.

The subject of aerial navigation is being treated seriously in England, which country has gone so far as to establish inland lighthouses similar to coast lighthouses to facilitate training in night navigation.

Flying Without Landmarks

Besides the above explanations of the navigation problems, which were made by Major H. O. D. Segrave of the British Military Mission in this country, additional details were given by Lt. W. A. Robson of the Royal Air Forces in the following statement. Lt. Robson's remarks further illustrate the problems that must be met and overcome to make night bombing a certain operation.

"The purpose of aerial navigation," said Lt. Robson, "is to enable the airman to find his way in the air; and, in particular, to find his way when he is unable to see the ground.

"Aerial navigation is a science which has been enormously developed during the war; in fact, before the outbreak of hostilities, very little attention had been paid to it; for pre-war cross-country flying was performed under condition in which the pilot always had a view of the ground, so that he relied upon landmarks and a compass to guide him on his way.

"If through untoward circumstances, such as a sudden fog arising, he lost sight of the ground, then he had to find his bearings by guess-work; no provision was made for such an eventuality.

"In those now remote days flying itself was the preoccupation and the arrival of the aviator at any precise destination was not a matter of first class importance, as it now is. Further, flying was not regularly undertaken at such vast heights and in all weathers—in fog and cloud and mist—as it is to-day; and night raids and long sea patrols were not thought of.

"Finding one's way with the earth in view is a simple matter. All that is required is a compass and a map. A compass course can be flown nowadays with a fair degree of accuracy; and miscalculations can quickly be adjusted by landmarks; for no stretch of country exists which does not furnish its clues to a keen observer.

The Matter of Drift

"It is when flying has to be carried out without the ground in view that difficulties arise. Chief among these is the question of drift. If a machine is to fly from a given point to a town 60 miles east, and there is a steady wind blowing 20 miles an hour northeast, it is a simple matter to allow for drift and calculate the direction of the compass course which the pilot must steer. But the direction and velocity of the wind may change considerably during the journey.

"If the ground is visible the distance the aircraft is drifting out of its course owing to change of wind can be judged either by the eye or by means of a simple instrument. This instrument consists of a flat calibrated glass disc marked with thin parallel lines. The disc is turned so that these lines are parallel with the direction of flight. Objects in the direct line of flight are observed as they appear beneath the glass disc; and the drift is easily determined. But obviously no such instrument can be used when the ground is not visible to the airman.

"Meteorology frequently enables the pilot to deal successfully with such situations by rule of thumb; and every British flying officer undergoes a meteorological course as part of his training.

"Another difficulty which besets the airman navigating without assistance from below is the question of speed. An air speed indicator records the rate at which he is rushing through the air; and that, indeed, is the vital fact so far as the stability of his machine is concerned. But it does not tell him how fast he is traveling in relation to the ground. For while his air speed may be 120 miles per hour, his ground speed will be only 80 miles per hour, if he is flying in the face of a 40 mile wind. An anemometer will tell him the speed and direction of the wind at the time of leaving his aerodrome. But, as previously stated, the velocity of the wind frequently changes; and of these changes he has no certain knowledge.

"Earlier in the war, night-flying was far more dangerous than it now is, on account of the difficulties connected with aerial navigation at night. Enormous progress has been made in this direction by the Royal Air Force both in regard to the Home Defense work in England and the work performed by the Night Bombing Squadrons in France. The former is clearly evident from the manner in which the German craft which have frequently attempted raids on England during the last 9 months have again and again been effectively repulsed, often with heavy losses.

Machine Forging in Automotive Plants

Methods Employed in the Production of Upset or Annular Forgings—Absence of Waste in Materials and the Elimination of Machining Operations Important Advantages

THERE are many steel parts in automobiles, motor trucks, tractors, etc., which are made from bar stock but require enlargement beyond the section of the original bar. Also, parts of annular form are made from bars of much smaller diameter. These operations are performed in a forging machine which is primarily a [illegible]etter, but which also acts as a punch.

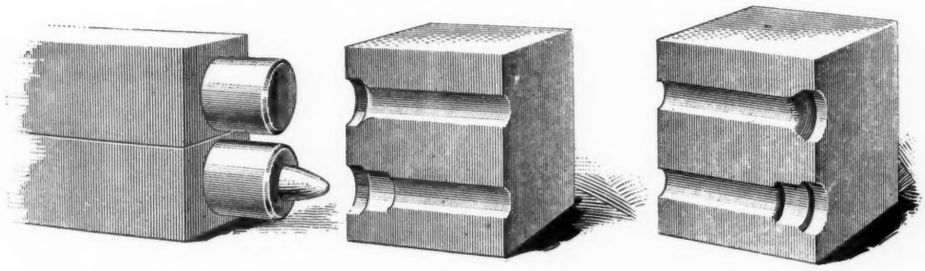
Perhaps the most common upsetting job is that required for forming the flywheel flange on a crankshaft, as practically every portable engine employs this method of flywheel fixing. There are, however, numerous other parts in motor trucks, tractors, etc., that can be advantageously made in the forging machine. For instance, clutch shafts and transmission shafts are sometimes formed with flanges to which the clutch drum or cone and the gear wheels are secured respectively. Bevel pinions are forged directly onto the shafts by merely upsetting the ends; worms are similarly forged integral with their shafts. Rear axle shafts are upset at the ends so that the keying, squaring or fluting for the joint with the differential gear and wheel hub will not reduce the strength of the end below that of the major portion of the shaft. In so-called three-quarter floating axles large disks are even forged on the ends of the shafts to secure the shaft rigidly to the wheel. Of the smaller parts of the automobile and motor truck that are formed in the forging machine may be mentioned spring bolts with integral grease cups and races for ball and roller bearings.

Designers of automobiles, tractors, etc., often are not as familiar with this class of work as they should be, and some information on the subject, based upon a recent publication of the National Machinery Co., Tiffin, O., may be of assistance.

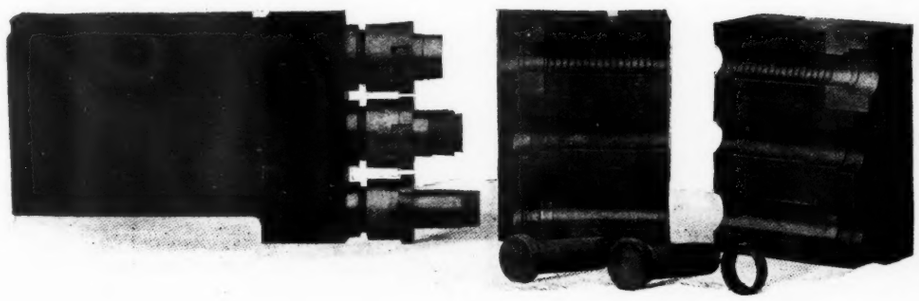
The forging machine consists essentially of a very substantial bed or frame with guides for two slides, the grip slide which grips the bar stock, and the heading slide. The heading slide is operated through a crank and connecting rod. The bar stock, after the end to be upset has been heated, is gripped in the gripping die which is made in halves and provided with a quick-acting opening mechanism. Practically every job has to undergo a number of successive operations, and the gripping die has a number of parallel openings or impressions equal to the number of operations and the header slide an equal number of headers.

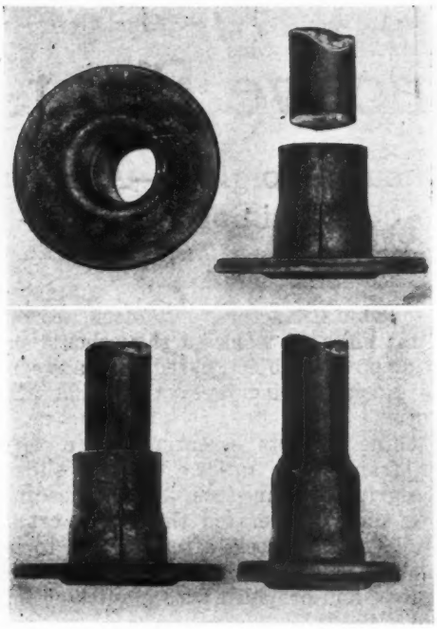
Forging a Spring Bolt with Grease Cup

A rather simple forging machine job is that of forging a spring bolt with integral grease cup. Formerly these bolts were made from bar stock equal in diameter to the maximum diameter of the head or grease cup, in automatic lathes, but the upsetting process economizes both stock and labor. The waste of stock is the more important because high grade material, such as nickel steel, is generally used for these pins. When made in automatics, with many designs, more material needs to be cut away than remains in the finished bolt, and the amount of labor wasted is quite large. By the upsetting process the bolts are made from stock about 0.020 in. larger in diameter than the finished shank of the bolt. The bolt forging illustrated herewith is made from 13/16 in. diameter stock in a forging or heading machine, whereas formerly it was made from 1⅜-in. stock in an automatic. The present process involves two operations. In the first operation a flange is formed on the end of the bar, equal in diameter to the largest diameter of the cup. In the second operation this flange is pierced and the metal behind the flange is expanded to form the cup. As a rule, these spring bolts are made from blanks previously cut to length, and the material is heated before being placed in the machine, so that the upsetting will cause no crystallization and resulting weakness. The bolts can be made

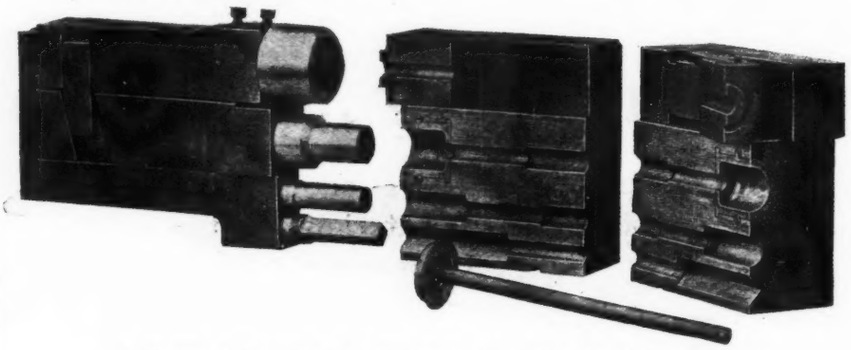


Above: Dies and heading tools for forging spring bolt. On right: Spring bolt. Below: Dies and headers for bearing race

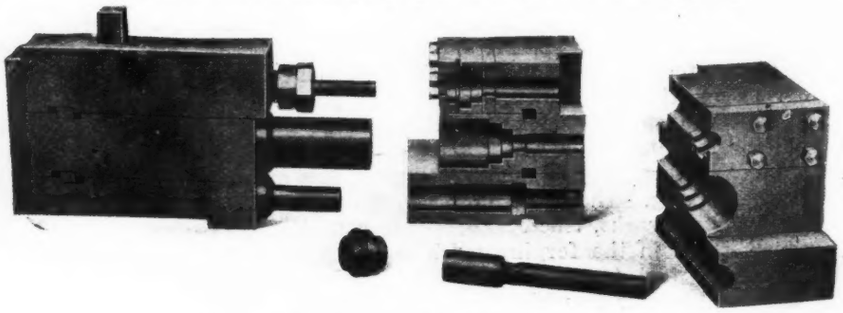




Steps in the manufacture of a wheel hub forging



Dies and tools used in forging axle shaft with driving flange



Dies and headers used for forging gear blank

of stock so close to the finished shank size that no machining is required, the shank being reduced to the finished dimension by grinding.

Roller bearing races also form a comparatively easy job for the forging machine. The race herewith illustrated is the outer one of the bearing, 3¾ inches in outside diameter, and it is made from open-hearth steel bar stock 2½ inches in diameter. There is no waste of material in the process; that is, all of the metal in the bar goes into the forgings, with the exception of the last end of the bar.

Gripping Dies

It will be seen that the gripping dies have three impressions, and the process involves three operations. For the first operation the bar is gripped in the top step of the dies. It will be seen that this step is made with threads or corrugations, as it has to hold the bar firmly against the pressure of the header. In the other steps this is not necessary because the pressure on the work is then transferred to the gripping die through the shoulder or shoulders of the upset.

In this particular operation only a moderate gather of material is required, which is easily effected in a single stroke of the header. In the design of the dies it is necessary to closely calculate the amount of gather required, and the dies must be set accordingly. It is interesting to know that the length of the bar projecting from the gripping portion of the gripping die must not be greater than three diameters, if the projecting part is unsupported, as otherwise it will buckle and upset unevenly. Therefore, if more gather than this is required, several successive upsetting operations are ordinarily necessary.

In the next operation in forming the race, the tapering race surface is formed, and in the final operation the race is "given another squeeze" and is separated from the bar by being punched through. For this last operation the race or upset on the bar is gripped in an annular impression in the gripping die, so that the punch may be withdrawn from the race after the latter has been separated from the bar.

Forging these race blanks is not an unusual job, except for the high degree of accuracy called for. No machine work is done on the races; they are finished by grinding only, and to make this practicable a limit of 0.020 in. was set on the finish. It is stated that this limit is not only adhered to, but the majority of the rings show variations of less than 0.010 in.

A most interesting part made on the forging machine is the rear axle shaft with integral driving flange as illustrated. This is made from 1⅜-in. chrome nickel steel stock, and the finished blank has a diameter of 5 in. The amount of material in the hub flange is equivalent to a length of 10⅞ in. of the 1⅜-in. diameter bar stock. In gathering such a large amount of stock, care must be exercised to secure a forging free from seams or cold-shuts. Practice has shown it to be advisable to make this forging in a four step die.

It was pointed out above that if an attempt were made to upset an unsupported length of bar stock of more than three diameters, the stock would buckle and thus spoil the work. In order to obviate this trouble, the projecting length of the bar must be guided in some way, so that it cannot buckle more than a certain amount. Also, where a large amount of gather is required, successive upsetting steps are necessary. In these successive steps it has been found advantageous to use alternate square and round guides.

Upsetting Stock Pockets

The first upset is in a square pocket in the grip die. This pocket is slightly larger across the flat than the diameter of the stock, thus guiding the stock in upsetting and preventing buckling. The second and third upsettings are in round pockets in the grip die, and these operations are performed at the same heating. Before the final operation is begun, the stock is reheated. One of the reasons for this is that the final operation is rather intricate, the recess on the inside of the flange being formed at this time. In order to make it possible to readily withdraw the finished blank from the die, the left half of the die is hinged, so that after the recess has been formed and the grip has opened, the movable half

of the die automatically backs out by virtue of its hinged or swinging action. The forging remains in the stationary die, and is lifted out by the operator. While it is possible to make forgings of this type in three steps, where rigid inspection is maintained, it is advisable to use a four step die, as the rejections will then be fewer in number.

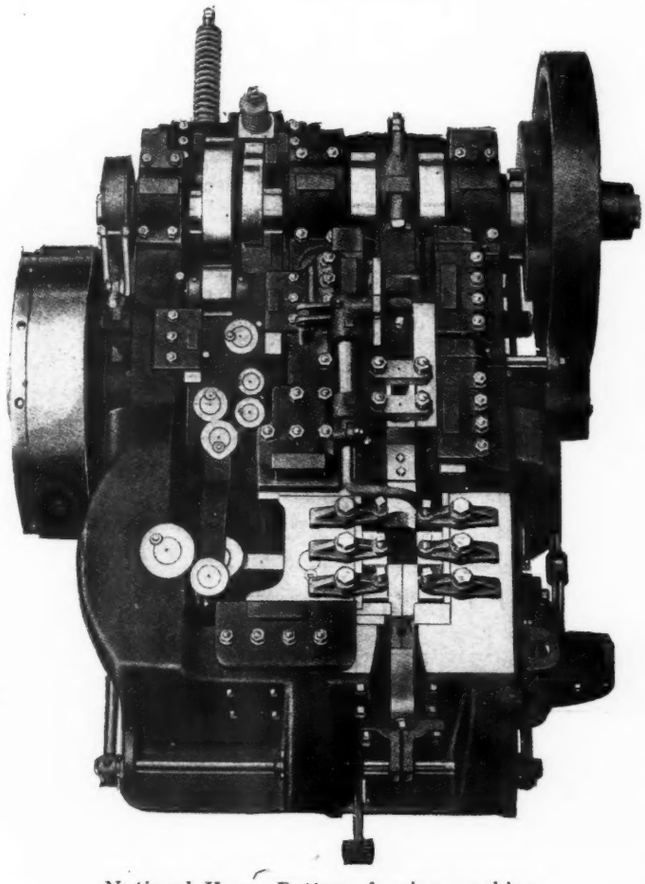
Another interesting part made in the forging machine is a motor truck wheel hub as pictured in one of the illustrations. This is made in three operations, in a three step die.

The First Operation

The first upset operation is illustrated at the right. The center portion of the hub is here upset and the flange is started. In the next operation the flange is upset to its full diameter, and a piercer of the heading tool partly enters the hub. On the third and final operation the hub is punched, and freed from the bar, the steel punched out remaining on the end of the bar, thus preventing waste. In making this hub forging, bar stock of 2⅝ in. diameter is used, and the flange is upset to 8¼ in. diameter and ½ in. thickness.

In the manufacture of gear blanks of chrome nickel and similar alloy steels, economy in material is of the greatest importance at the present time. Where small pinions are involved, the blanks in the past have sometimes been cut directly from the bar, and in other cases they are forged in the drop hammer. In both cases there is a waste of material in the first due to the machining, and in the second because of the tongue hold and flash.

In the forging machine such blanks may be produced absolutely without waste. The gear blank illustrated herewith, which is of more than ordinarily complicated form, can be forged in three operations. In the bottom groove of the die the stock is gathered into a cylindrical upset, which in turn is raised to the middle groove of the die, where the gear blank is formed to the final dimensions. In the top step of the die, the punch pierces the hole and detaches the gear from the bar.



National Heavy-Pattern forging machine

In order to prevent buckling when large amounts of stock have to be gathered, guides can be formed either in the gripping die or in the header. For instance, the limit of length of unsupported stock which can be gathered or upset in one blow without injurious buckling is three diameters of the bar, but if the stock is gathered in a pocket in the gripping die not more than one and one-half times the diameter of the bar, then the length upset in one blow may be somewhat greater.

Where large amounts of stock have to be gathered it is usual to form a pocket in the end of the gripping die of about 1.3 times the diameter of the bar. In the next operation the diameter of the pocket can be 1.7 times that of the bar and so on. A still better plan is to make the first pocket of square section, with the sides only a little wider than the diameter of the bar. Then there is very little chance for the bar to buckle while being upset, yet there is considerable space in the corners of the square for the metal to gather in. The next pocket would be made round, of a diameter a little larger than the length of the diagonal of the square across the corners.

Special Forms of Stock Gathering Pockets

The whole aim in the design of dies is to reduce the number of operations required to produce the finished forging to the smallest possible number consistent with the accuracy and the quality of material demanded. The more stock that can be gathered in a single blow the fewer, generally will be the operations required. When the bar protrudes from the gripping die too far, it tends to buckle, and the buckling is most pronounced, naturally, at the middle of the protruding portion. Therefore, at this point the guide must come close to the bar. Therefore, if a large amount of stock is to be gathered in a single blow, the pocket in the gripping die is made cylindrical at the outer end for a little more than one-half its length, and the remaining portion of the pocket is cone-shaped, the diameter being gradually increased. The bar is gripped in the die so that its end projects slightly beyond the end thereof, and when buckling occurs it is soon stopped by the wall of the pocket. The heading tool is of such diameter that it enters the end of the pocket in the gripping die. Owing to the friction between the die and the bar after the latter has come in contact with the wall of the pocket through buckling, the outward end of the bar will upset first, the stock will gradually carry back in the die and a uniform frustrum-shaped upset will be produced.

The Happy Farmer Tractor

THROUGH the kindness of the La Crosse Tractor Co., La Crosse, Wis., we are now able to give further information regarding one feature of the Happy Farmer tractor which was not brought out with due prominence in the descriptive article which appeared in the July 18 issue of AUTOMOTIVE INDUSTRIES.

The use of a patented device in the bottom of the crankcase makes it impossible for the small amount of kerosene which may work past the piston rings and thus mix with the lubricating oil to reach the bearings.

As was pointed out in the descriptive article, the crankcase is drained automatically, the oil being conducted to the transmission and differential gear cases and thence to the outer roller pinions and bull wheels.

The FORUM

Problems of Gear Standardization

By B. F. Waterman

Chairman, General Standardization Committee, American Gear Manufacturers' Association

IN the May 30 issue of AUTOMOTIVE INDUSTRIES, on page 1053, appears an article under the above title which sounds a note which I am sure is foreign to the purposes of the American Gear Manufacturers' Association. After stating that "such standardization presents great opportunities for both good and evil," the writer goes on to say that "from the point of the gear manufacturers good only can result, but there may be danger to those whose interests lie in the search of mechanical efficiency or the development of new and improved methods of transmitting power."

It is this fear that standards may be adopted that will tend to discourage improvements in gear design that is unwarranted.

It may be stated here that any attempt to limit improvements in the design of gears or their application, or any standard having this effect, would be fatal to the success of any gear manufacturer who attempted to impose it upon his customers.

Most of the members of the American Gear Manufacturers' Association are just what their name implies—"manufacturers of gears"—and use but very few themselves, most of their products being made to customers' specifications.

In the report of the "General Standardization Committee" read at the last annual meeting the intentions of the association were clearly set forth as follows: "This association has considered it advisable, for the advancement of the gear industry, to appoint as one of its standing committees a General Standardization Committee, to consider and develop from the mass of data which now exists in various forms, standards for use in this industry, and which will be of value to all who may have to do with gears, either as manufacturers or as users."

It was stated further that "what we produce must fill certain standards of quality. What these are must be determined by ourselves and the users of the gears. It would be folly for us to set standards of quality if they do not fit the conditions of use to which the gears will be put, and there will always be conditions that any standard we make will not fit."

Also, at this meeting a resolution was adopted as follows: "Recognizing the desirability of co-operation in order to prevent conflict and the putting of more than one standard before the public, the American Gear Manufacturers' Association is willing and anxious to co-operate with other organizations interested in the standardization of apparatus where gears are used and in the betterment of conditions in the industries which may use gears."

Surely this speaks well for our intentions, and users of gears need not fear that the standardization of gears will retard, in the least, any new improvements in the growing field of gear transmission.

The other points in this article are well taken, except an expression in the last paragraph, as follows: "His (the user's) interest is in one phase opposed to that of the maker." This cannot be so any more than in any other line of manufacture. The user's interests and the manufacturer's are the same, and those manufacturers who realize this the most vividly will enjoy the greatest success. Ease of manufacture and increased production in no way affect the issue. It is true that the standards that may be adopted will make the manufacture of gears easier to accomplish, but there can be no increased production unless we please our customers.

In this letter it has been the writer's endeavor to impress those who are interested in gears and their standardization that the American Gear Manufacturers' Association's object is to advance the gear manufacturing industry and the use of gears to a point where everyone having to do with gears will be able to obtain those best suited for any purpose, either from the manufacturers of them or, if they see fit, to make them themselves from the same standards.

—

Throttle-Controlled vs. Constant-Compression Engines

By P. S. Tice

WITHOUT the least desire or intent to decry the endeavors of those in this country who are engaged in efforts to design and produce engines for automotive purposes along the lines discussed by Mr. Sargent in the June 27 issue of AUTOMOTIVE INDUSTRIES, I feel that Mr. Sargent in that article has done the throttle-controlled engine a grave injustice in the economy figures he has assigned to it as characteristic.

Mr. Sargent's values for the fuel consumptions in this type engine, as given in his Fig. 1, are so excessively high as to make one wonder when and under what conditions of adjustment they were obtained. Such values *can* be obtained, of course; but they are by no means characteristic of modern practice.

It seems to me that in comparisons of this nature such figures as are published to point the comparison should be of the same order of practice, and not, as in Mr. Sargent's paper, a side-by-side presentation of an extremely good curve

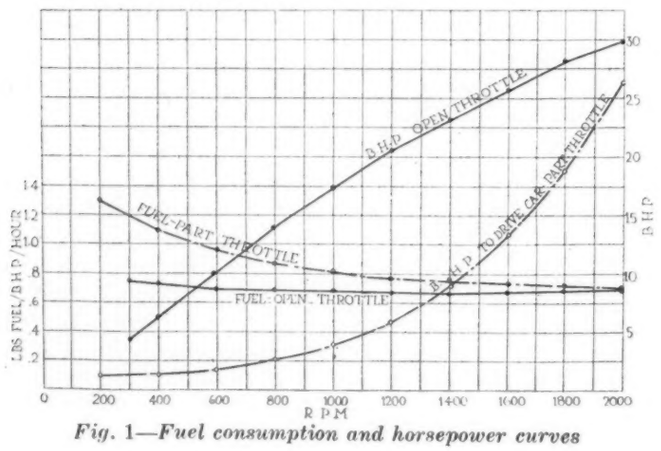


Fig. 1—Fuel consumption and horsepower curves

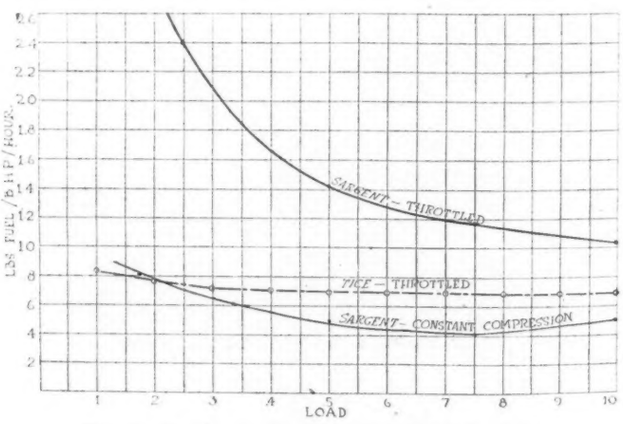


Fig. 2—Fuel consumption as related to load

from a "constant compression" engine and an almost impossibly inferior one from a "throttled" engine.

Referring to the two curve sheets attached, Fig. 1 shows corresponding fuel consumption and horsepower curves from a small four-cylinder automobile motor, for the two conditions of open throttle and part throttle necessary to drive the car on a level cement road.

It will be seen that the maximum fuel consumption occurs at idling, when the throttling is greatest. In Fig. 2, I have plotted reproductions of Mr. Sargent's two curves, and with them to his co-ordinates the part load consumptions of Fig. 1.

While for all loads except the extremely small ones Mr. Sargent's curve for the "constant compression" engine is superior, the really enormous discrepancy between the "throttled" curve which I have drawn in and that offered by Mr. Sargent is at once apparent.

The curve marked "Tice-throttled" is I believe representative of our best modern practice in throttle-controlled engine performance.

—

The Engine for the Fuel of To-morrow

By W. L. Dempsey

THE four-cycle gas engine made the automotive industry and 70 deg. gasoline made the four-cycle engine. We still have the four-stroke engine, but 70 deg. gasoline is a memory, and in a few years more it will be history.

Let it never be forgotten that the four-cycle engine is an explosive engine depending always on a dry gas for its power, and that the dryness of a charge varies directly in proportion to the heat applied at standard pressure. It may also be stated that the thermal and mechanical efficiency of a four-cycle engine is in direct proportion to the dryness of a proper charge.

The enormously increasing demand for hydro-carbon fuel caused by a like increase in the manufacture and use of the four-cycle engine for pleasure cars, motor trucks, tractors and aeroplanes has compelled the refiners of crude oil to introduce methods of distillation such as the Burton, Rittman, Dewey and others that require average maximum temperatures of from 500 to 600 deg. Fahr. or even higher.

Since practically all engines are water cooled, the high temperatures necessary to fully gasify the fuel are seldom obtained, so that a large proportion of the fuel is not only wasted, but seriously affects the operation of the engine, by carbon deposits, oil dilution, etc. Since water can absorb and retain not more than 212 deg. Fahr. of heat, a water jacketed carbureter serves only to vaporize the lighter part of the fuel, while the heavier part, that part which requires more than 212 deg. of heat to gasify, is either drawn into the cylinder in a raw state or remains accumulating in the carbureter. It seems to the author that the carbureter manufacturers could greatly improve their product by providing means for the application of heat to both the air and fuel sufficient to maintain uniform temperatures at all speeds of 400 to 600 deg. Fahr.

Any liquid hydro-carbon fuel of whatever density or volatility may be economically and successfully used as a motor fuel in a four-cycle engine of variable speeds provided sufficient heat is applied to transform it into a dry gas and provided sufficient air is furnished to insure complete combustion of the fuel. The dividing lines between gasoline, naphtha and kerosene are just about as definite, distinct and visible as are the outlines of a camouflaged ship far out at sea. The only accurate and exact way to define the quality and volatility of a hydro-carbon liquid fuel seems to be to give the minimum and maximum degrees of heat at which it was distilled. The gasoline of to-day was kerosene yesterday and will possibly be petroleum ether to-morrow.

The automotive industry will live, it will grow and thrive, but the heart of the industry is the engine and it is sorely afflicted. The fuel situation has changed radically and fundamentally, and the engine must change with the fuel to save the industry. It will be a four-stroke engine no doubt, but changed how? Will it be a four-cycle dry gas explosive engine or will it be a four-stroke or two-stroke slow burning constant speed oil engine? That is the question. That it must change and be improved to adapt it to the fuel available all will admit, but how? There is the rub.

The writer believes that the motor of to-morrow will be a four-stroke variable speed dry gas explosive motor capable of successfully using a liquid hydro-carbon fuel of any degree of density down to perhaps 30 deg. Baume, and distilled at a maximum temperature of 700 deg. Fahr. such an engine must provide means for:

First—The complete gasification of the fuel by the application of an amount of heat greater than that at which the fuel was originally distilled.

Second—Means for surcharging the cylinder at the end of the charging stroke with an amount of oxygen equal to or greater than that which is dissipated in the act of gasification.

Third—Means for the retardation of the rise in temperature due to compression sufficiently to obtain efficient compression pressures, by the introduction of cooling elements into the cylinder at the beginning of the compression stroke.

Fourth—Means for the equalization of the temperature of the piston and cylinder walls so that a proper clearance between them may be maintained at all temperatures without danger of seizing or looseness.

Fifth—Means for the complete expulsion from the cylinder of all the products of combustion which would result in lower internal temperature and thereby increasing the temperature range.

—

Tanning by Means of Chromium Salts

PREVIOUS to the war, tanning by means of chromium salts was an industry almost exclusively American and German. The Central Empires, particularly, had monopolized the important market of British India. Chrome leather is used largely in the industries, in automobile work for clutch facings and universal joints.

The British Government recently had the chrome tanning situation looked into with the intention of introducing the process either in England or Hindustan, and *The Board of Trade Journal* of May 9 gives some details regarding the processes of chrome tanning and the history of their development. The action of the basic chromium salts is due to their property of furnishing colloidal solutions which are slowly absorbed by the skins, the fibres of which are separated and modified in their chemical composition in such a way as to obviate any swelling due to the action of water.

As far back as 1858 Knapp described a process making use of a mixture of alum, chromium and carbonate of soda; this method of operation has remained in use to this day under the name of the single bath process. In the United States, August Schultz in 1884 introduced the double bath process. The skins are impregnated with a solution of bichromate of potash, acidified by means of hydrochloric acid. Then the chromic acid absorbed by them is reduced by means of sulphurous acid obtained by immersion in an acid solution of sodium hyposulphite. It is probable that in this second operation the chromic acid forms with the hypo-sulphite a colloidal compound of the formula Cr_2O_3, CO_3, H_2O and tetra thionate of soda, $Na_2S_4O_6$. This reaction is indicated by the brown color which the skins assume. This color later becomes lighter and gives way to a bluish tint, probably due to the action of the hydrochloric acid, with the production of the chromium chlorate and precipitation of colloidal sulphur. The incorporation of free sulphur in the latter makes it more supple and gives it a better color than is obtainable with the single bath process. The latter nevertheless is preferred on account of its easier application.

The advantages of tanning with chromium salts are as follows: The time required for the operation is shorter and the capacity of production of tanneries is therefore increased. It furnishes impermeable dense leathers which are very much in demand for box calf and chevreaux glace. Their tenacity makes them especially applicable to certain uses. On the other hand, the property of chrome salts to form lacquers with certain pigments renders the process particularly interesting for the production of colored leathers.

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Do We Want to Sell Cars in Australia?

AUSTRALIA is and has been for many years one of the best customers of the American automobile industry. Even during these times of shipping shortage and output curtailment, she has bought a relatively large number of our cars. During the twelve months ending with June 30, 1918, 4307 cars valued at $3,410,557 were sent on the long journey to this distant antipodal continent. Under more favorable shipping and production conditions, her purchases would have been much larger.

Australians buy our cars not because they like us, but because, through our quantity production methods made possible primarily by the great size of our own country, with the resulting huge home demand, we have been able to sell them cars which do exceedingly well what they expect them to do, at prices, including duty and shipping charges, which are less than those charged there for the cars made in other countries.

We do not mean to say that American cars have sold in Australia merely on a price basis, for this is not true. But it can be said without departing from facts that it has been a matter in which price has governed to a considerable extent, and quality in a smaller amount. We should be curtailing our powers of observation to a self-injuring degree if we did not make note of the fact that when the Australian wants to spend money for something he thinks extra fine in the motor car line he buys a British car and pays a higher price for it.

Up to now we haven't minded this very much because bulk sales have been somewhat in our favor, but, after the war, conditions will be different and if American manufacturers are to retain their hold on the Australian market they must alter their selling methods and begin right now whether they have cars to ship or not.

There are two factors which will sooner or later affect the Australian market unfavorably from the American makers' point of view. One of these factors will become effective almost as soon as the war stops, but the other will develop more slowly and develop to an extent dependent very largely upon what we do.

British manufacturers who made motor cars before the war on what, to our way of thinking, was a limited scale, have built great plants and developed huge organizations since the war began. We referred to one case in AUTOMOTIVE INDUSTRIES about a week ago. With a pre-war payroll of some 2500 names, what was then a large British car manufacturing concern now has more than 20,000 employees and a plant that has grown in proportion. What is that concern to do after the war?

There is a new conception of quantity production among British manufacturers and they have the facilities for tremendous outputs. Is it reasonable to suppose that they will stand by serenely and watch some one else pocket the profits from a huge export business in low and moderate priced cars? Isn't it safe to assume and wise foresight to conclude that the American car will have to face much keener competition in Australia and elsewhere, after the war? We know that our product has quality and are not afraid of competitors, but if we do not begin now to go after our Australian trade harder than we ever went after it before, we shall find when the war is over that someone has beaten us to it, as it were.

The other thing we must keep in mind with regard to our Australian trade is that during this period of relative inaction on that continent when nothing very much leaves there and no more arrives, when planters are considering whether they should plant less wheat and other food products on account of the inability to ship what they have already raised, the thoughts of the people have been turned away from agriculture to an extent, to the possibilities of industry. Manufacturing is being taken up as never before. Mines are developing and steel mills are being built. Some day there may be, probably will be, an Australian motor car industry. How rapidly it grows and how large it eventually becomes will depend upon how well we persuade the Australians that we can fill their motor car needs.

Killing the Goose

By David Beecroft

KNOCKING is not dead yet. Last week there was a tractor demonstration in New York State at which over 5000 farmers attended to watch ten tractors plow. Each tractor maker was given 15 minutes to put forth the special merits of his tractor to the crowd.

Eight of the ten tractor representatives took occasion to knock the other makes. Only two makers told a clean story, a tractor merchandising story.

The psychological effect of the knocking on the farmers was most apparent. Scarcely had some of these factory representatives stopped their knocking oration than farmers gave evidence of the uncertainty in their minds regarding tractors in general.

One tractor maker's representative took occasion to knock the creeper type. He failed to realize that those 5000 farmers were all capable of judging for themselves. He failed to realize that his job is not against the creeper type, but against the horse. Others knocked ignition systems and general designs.

It will be too bad if the farm tractor makers fall into this old pitfall. The work of the tractor maker is converting the farm from the horse-pace that has been controlled by generations, in fact centuries, and bringing it up to the tractor-pace, which is a matter of a few years. The big job is getting all phases of farm activities onto the tractor-pace basis.

All forms of farm machinery must be brought up to the tractor standard. This must be done in regard to the grade of metals used, in regard to the accuracy of workmanship, and in regard to the general superiority of design.

With all of these problems facing them the tractor makers have no time to knock. They have no time to try to split the industry into two divisions, creeper types on one side and wheeled types on the other side, or any other divisions. If they want to argue the relative merits of these designs let them do so in their organization meetings; they should not talk this to the consumer.

Tractor makers must educate the farmer to the many problems of the tractor. They must educate him to standards of higher efficiency. They must educate him to give more attention to his machinery. They must educate him to a fuller knowledge of the mechanics of tractors. They must educate him in the principles of increased capacity for work through improved machinery.

The work to-day is for the tractor industry to present a united front to the farmer. It is a pernicious policy to knock and cloud the farmer's mind. That knocking directs the farmer's attention from the biggest problem ahead, namely, greater working capacity and greater acre productiveness through tractor cultivation.

Why get on a house top to proclaim to the farmer the imaginary weaknesses of your competitor's machine?

In your effort to kill a sale for a competitor's machine you are taking the surest course to kill a sale for your own machine.

Knocking is as old as the human race and gives promise of continuing as long as the race continues. Knocking reminds you of the biblical phrase: "We spend our years as a tale that is told." We are continuing to do the things that have been done in the past and which should not be repeated.

The farmer attending his first tractor demonstration approaches the tractor as if it were a blank sheet, or a clean sheet of paper. He has no criticism chalked up against it. He wants to see it perform and then he will chalk up good or bad marks against it as necessary. Why then should the representative of the tractor maker start off by his knocking program to literally fill up with black marks this clean sheet that the farmer has on the tractor? It will normally fill up soon enough, but the tractor maker's representative is not content with such speed; he literally wants to fill it in advance, and indirectly is doing his best to kill sales—to kill the goose that lays the golden eggs.

□ Latest News of the

Airplane Program Mercilessly Criticized

Senate Report Condemns All Past Activities—Blames Personnel of Board—Liberty Engine Program Responsible for Delay—Too Many Favors Given Dayton and Detroit—Recommends Creation of Ministry of Aeronautics

WASHINGTON, Aug. 26—The creation of a Ministry of Aeronautics, with a single head as Secretary of Aeronautics, is the recommendation of the Senate Military Affairs Committee in its long-expected report, issued to-day. The report condemns all of the past activities of the Aircraft Production Board, although it admits the difficulty encountered in aircraft production during the past year.

In summarizing the report states that on April 6, 1917, we entered the war, and on June 8, 1917, an announcement was made that a fleet of 25,000 airplanes was to be created.

On July 24, 1917, $640,000,000 was appropriated to carry out the aircraft program, which fund has been exhausted either by actual expenditure or commitments.

A further appropriation of $884,304,758 has been found necessary.

In the opinion of the committee a substantial part of the first appropriation was practically wasted. While much good work has been accomplished, for which the committee states due credit should be given, it must be admitted that our airplane program up to the present presented many aspects of failure. While an army of 3,500,000 men has been made, the aircraft situation is as follows:

Up to Aug. 1, 601 De Haviland 4 observation airplanes have been embarked for France, of which number sixty-seven reached the front by July 1.

On Aug. 7 a squad of eighteen De Haviland 4's flew over the German lines, but the details of their performances have not been received.

We have not a single American made chasse or fighting plane upon the battlefront.

We have not a single American heavy bombing plane on the battlefront.

We have not developed and put in quantity production a successful chasse or fighting plane.

Our attempt to create a fighting plane was centered in an effort to adopt the Bristol fighter and the De Haviland 4 to the Liberty engine. The Bristol was put into quantity production without sufficient test and over $6,500,000 was expended and the lives of several men sacrificed when the machine was condemned and its manufacture discontinued.

After more than 1200 standard J training planes equipped with a Hall-Scott engine had been manufactured, at a cost of $6,000,000, the machine was condemned as dangerous and placed in storage.

An oral order was given the Curtiss Aircraft Corp. for 3000 Spad machines. Early in December, 1917, and later in the same month, Col. Clarke and Major Jesse G. Vincent found that the machine could not be operated with a Liberty engine. On Oct. 8 of the same year the contract was cancelled, the reason given being that the single-seater fighter was obsolete; but, states the committee, on April, 23, 1918, contract was let to the Curtiss company to build 1000 S E 5, the English equivalent of the Spad. The cancellation of the Spad contract and the failure of the Bristol left us without a single- or two-seated fighter except the De Haviland 4 which we are equipping for reconnoitering, although it was originally designed as a fighter.

As early as October, 1917, we were in possession of the facilities for construction of the Caproni planes. Expert Italian engineers have been here since June, 1918, but we have up-to-date constructed only one Caproni plane. Nearly a year has elapsed since we might have begun work on these machines and by this time should have been in quantity production.

The Handley-Page bombing plane is another example of our delay. Plans were furnished the Signal Corps as early as the summer of 1917 and contracts were being made until February, 1918. Delivery on these was not begun until August, 1918. The first Handley-Page plane was flown last July. Tests on it are not yet complete.

Three causes have been pointed out by the committee as being chiefly responsible for the disappointing results up-to-date, as follows:

1—That the airplane program is largely placed in the control of the great automobile and other manufacturers who are ignorant of aeronautic problems.

2—These manufacturers undertook the impossible task of creating an engine which could be adapted to all classes of flying craft. It is not too much to say that our airplane program has been largely subordinated to the Liberty engine.

3—We failed at the beginning of the war to adopt a commonsense course of reproducing the most approved type of European machines in as great numbers as possible. This should have been carried on co-incident with the production of the Liberty engine. This sound policy has only recently been adopted after a lamentable lapse of time.

The committee states this brief summary is not a wholesale condemnation of our airplane program. Much has been accomplished. The committee is glad to report that while it believes there are many things to be remedied, nevertheless, we are approaching a period when quantity production of planes may be hoped for.

The report condemns the construction of the McCook Field at Dayton, Ohio, as

(*Continued on page* 346)

Motorcycle Men to Economize

WASHINGTON, Aug. 21—Representatives of the motorcycle industry conferred to-day with the Conservation Division of the War Industries Board relative to a program to effect economies in the use of metals and rubber in the manufacture of motorcycles. The manufacturers agreed to work out technical problems with a view to effecting such

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economies and to report within a few weeks through a War Service Committee which is to be organized by the motorcycle industry.

The industry consumes considerable steel, copper tubing, brass tubing, tin plate and rubber and it is now asked to suggest means for the use of substitutes for the metals, particularly copper and brass, which are needed in the war program. The representatives agreed to give the matter close consideration and to make suggestions to the Conservation Division which will form a basis for recommendations by the latter.

The motorcycle industry was represented at the meeting to-day by T. C. Butler, Jr., C. B. Franklin and F. J. Weschler of Springfield, Mass.; F. B. Rodgers, Arthur Davidson, W. S. Marley and August Frey, Milwaukee and A. G. Hale and F. J. Stareck, Cleveland.

Homes for Shipbuilders to be Erected

WYANDOTTE, MICH., Aug. 20—Two hundred houses for ship builders will be erected in Wyandotte by the United States shipping board.

Ford Passenger Car Prices Advanced

Touring Car Costs $75 More and Truck Is Reduced $50

DETROIT, Aug. 19—The Ford Motor Co. has advanced the prices of its passenger car models, varying from $65 to $90, effective Aug. 16. The touring car has been increased $75; roadster, $65; coupelet, $90; sedan, $80; chassis, $75. Simultaneous with the announcement of these increases, a reduction of $50 was made in the price of the truck, which came as a surprise to the trade and upon which the company declined to comment.

On June 10 the company had bona fide unfilled orders on its books for 110,607 cars, divided as follows: Touring cars, 89,242; roadsters, 9824; coupelets, 3013; sedans, 1675; trucks, 5234; chassis, 1619. The company now has unfilled orders approximating 112,000, 85 per cent of which is passenger cars. Present and former prices of Ford cars are shown below.

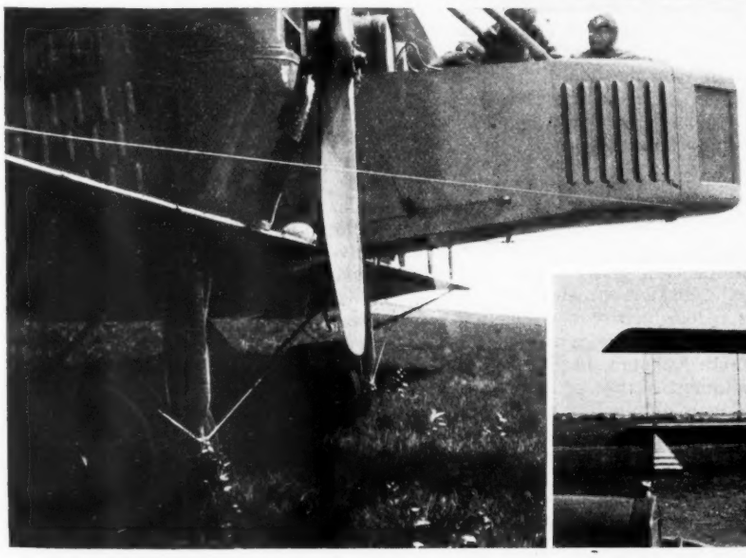
The Ford Motor Co. of Canada has also increased its passenger car prices, effective Aug. 16, from $85 to $105. The price of the truck remains the same, $750. Prices follow:

Model	Old Price	New Price	Increase
Touring	$585	$690	$95
Roadster	555	660	105
Coupelet	770	875	105
Sedan	970	1,055	85
Chassis	535	625	90

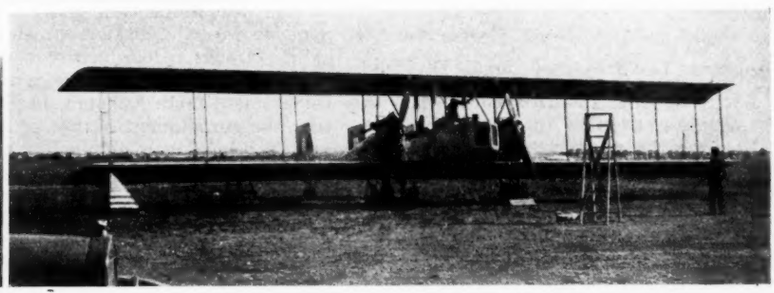
Prices are all exclusive war taxes.

Model	Aug. 16, 1918	Aug. 1, 1917	Aug. 1, 1916	Aug. 1, 1915	Aug. 1, 1914	Aug. 1, 1913	Aug. 1, 1912
Touring	$525	$360	$360	$440	$490	$550	$600
Roadster	550	345	345	390	440	500	525
Coupelet	650	505	505	590	750	...	...
Sedan	775	645	640	740	975	...	...
Town car	Discont'd	Discont'd	595	640	690	740	...
Truck	550	600	...	...	...	...	...
Chassis	475	325	325	360	Not Sold	Not Sold	Not Sold

An American-Built Caproni Biplane, Equipped with Liberty Engine



Italian officials state that the Caproni is considerably improved by the use of the Liberty engine instead of the engine used in Italy, as it provides about 60 hp. additional



The Liberty engine used is of the Seaplane type, developing about 360 hp. It is of similar design to the military type but develops about 90 hp. less. Major General William L. Kenly, Chief of the Department of Military Aeronautics, U. S. Army, is seated in the machine shown in the large photograph

Ford Production Is 700,000

85,000 Below the Total for 1917 —Over 100,000 Unfilled Orders —Assembly Plants Shut Down

DETROIT, Aug. 14—During the fiscal year ending July 31 the production of the Ford Motor Co. totaled approximately 700,000 cars, as compared with a total of 785,000 during last year. It is understood that on June 10 there were unfilled orders for 110,607 cars on the books.

The assembly of cars at the company's branches at Washington, Denver, Houston, Los Angeles, Buffalo and Oklahoma City has been discontinued, and the Government has taken over the assembling plants in Philadelphia; Cambridge, Mass.; St. Louis; Pittsburgh; Seattle; Portland, Me.; Indianapolis; Louisville; Cincinnati and Milwaukee for either storage purposes or other war work. The men formerly employed at these plants are working on war production business. The Canadian plant at Ford City, Ont., has been reopened.

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U. S. Rubber Co.'s Earnings Show Big Increase

NEW YORK, Aug. 17—Net earnings of the United States Rubber Co. for the six months ending June 30 amounted to $10,242,365 after allowances for interest charges, depreciation and reserve for Federal taxes were made. The total earnings for the same period last year were $7,239,966.

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American de Havilands Make Successful Reconnaissance

WASHINGTON, Aug. 16 — Eighteen American-made De Haviland-4 airplanes, equipped with Liberty engines, have made a reconnaissance over the German lines and returned safely, according to a cable from General Pershing to Secretary of War Newton D. Baker. General Foulois, head of the airplane division of the American Expeditionary Forces, personally led the expedition, which also included Lieut. Blair Thaw. This is the first extended use of a complete squadron of Liberty engine equipped planes, and the results were very pleasing to Washington officials.

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Firestone Declares Additional Dividend

AKRON, Aug. 16—In accordance with a resolution adopted in December, providing for the payment of an additional dividend should same be warranted by business development, the Firestone Tire & Rubber Co. has informed its stockholders that as business justifies this payment a special dividend of $1 per share is declared upon the issued common capital stock of the company. This special dividend is in addition to the dividend of $1.25 per share, both being payable on September 20 to stockholders of record September 10.

It is estimated that, after allowing for the restrictions on crude rubber and the production of pneumatic tires, sales for the fiscal year will amount to $75,000,000. The company is doing an increased solid tire business, and has diverted portion of its plant to war essentials.

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Motorcycles and Bicycles Are Essential

WASHINGTON, Aug. 19—Motorcycles and bicycles have been recognized as essential by the Priorities Division of the War Industries Board, following a meeting between the representatives of these industries with the Board. It was recognized in the meeting that the output of motorcycles is almost entirely absorbed by direct Government purchases, that the remainder is devoted largely to essential commercial purposes and that bicycles have come to be used by workers as a method of transportation.

It was also found that there were opportunities for substantial savings in the use of steel and rubber in these industries and both industries pledged themselves to effect such savings as will be worked out in a program of conservation in co-operation with the War Industries Board.

Subject to those pledges and the carrying out of the conservation plan it was considered necessary to recognize the industries as entitled to their reasonable requirements of materials.

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British Society of Motor Manufacturers Elects New President

BRISTOL, CONN., Aug. 16 — Albert Brown, one of the founders of the firm of Brown Brothers, London, England, a company having commercial relations with the automotive industry throughout the world, has been elected president of the Society of Motor Manufacturers and Traders of the United Kingdom. One of Mr. Brown's primary aims is the securing of co-operation between American, French and British business men and with this end in view he has written to President DeWitt Page of the New Departure Mfg. Co. inviting such co-operation and help in getting together.

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Skilled Labor Situation Improves

WASHINGTON, Aug. 16—Curtailment of non-war production is lightening the general labor situation praticularly in skilled trades, according to the Department of Labor. Reports received by the Department from Kokomo, Indiana, show that the curtailment output of passenger cars is releasing a number of mechanics for war work. Similar reports from other sections, it is stated, show that conservation of manpower resources is being gained by reduction in the output of so-called non-essentials. The Department of Labor states that despite this improvement the general skilled labor shortage is still serious and can only be relieved by the transfers from non-war industries.

Organize Wisconsin Tractor Service

Power Farming Association Plans Better Co-operation with Farmers

MILWAUKEE, Aug. 19.—Plans for bringing tractor service in Wisconsin to a high state of organization and efficiency are now being made by the Wisconsin Power Farming Association, organized by representatives of more than 15 large tractor manufacturers located in or having branches in Wisconsin. A principal activity from the beginning will be to give service to farmers who own tractors in much the same manner as the highly-developed service plans in effect in the passenger and commercial car fields. In line with this policy, it is the intention of the association to make it obligatory upon every dealer in tractors to carry a sufficient stock of parts to enable farmers to keep their machines in service at all times, and more particularly during the rush seasons.

This plan involves also ample provision for quick service in making repairs and replacements, either in an established service station, or on the ground. Details have not been fully developed, but excellent progress is being made and the association hopes to have its plan in operation by the time the fall plowing season begins.

This development in the farm tractor field in Wisconsin is regarded by motor car dealers and garagemen as most favorable to their business, since they have established service stations and generally ample accommodations for carrying stocks of parts, and in addition have a wide experience in furnishing service of this character. Under existing conditions in the passenger car industry, there undoubtedly will be considerable available capacity in many garages open to just such utilization as this. It is felt that the garages in the smaller communities of Wisconsin are particularly well situated in this respect, as they are close to the field of operations of the tractor and can quickly adapt their existing organizations to tractor service without prejudice to the attention required by the present passenger and commercial car demands.

Tractor and motor car men as well, who have made a study of conditions in Wisconsin, say that up to this time the motor car trade has left the tractor business pretty much to the farm implement dealers. One of the reasons ascribed for this fact is that the motor car dealers have been too fully occupied with their ordinary and regular car and truck business to be able to assume the added responsibilities involved in the acquirement of tractor sales or distribution rights, with the attendant demand for service.

With the readjustment that is expected to come in the passenger car industry, the way is opened to dealers to enter the tractor business on a broad scale, with

almost every requisite advantage already at hand. At the same time the farm implement trade is rather poorly equipped, relatively speaking. Implement and farm machinery service is an infant, compared to motor car and truck service, and it is nowhere near the state of efficiency that the rapid development of the tractor already requires.

The men who compose the Wisconsin Power Farming Association either are the sales managers of the tractor manufacturers located in Wisconsin, or the state distributers or branch managers. Their business, of course, is to merchandise the product to the greatest possible advantage and the ability to give service is a prime consideration in the selection and retention of tractor dealers. While no intimation has ever been made by any member concerning the availability of motor car dealers in prosecuting tractor distribution, it is known that the position of these dealers, especially with respect to service and maintenance, finds favor among the tractor men and they are willing to give due consideration when the selection of a dealer involves both a farm implement and a motor car representative.

The Wisconsin association has scheduled another meeting for Tuesday, Aug. 27, at the Hotel Medford, Milwaukee, at which time plans will be made for a general tractor meeting during State Fair week, Sept. 9-14. This will be held at the Republican House, Milwaukee, on Friday, Sept. 13, and a general invitation will be issued to dealers and owners to be present to become acquainted with the operation of the tractor service now being formulated.

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Milwaukee Organizes Branch of National Association of Purchasing Agents

MILWAUKEE, Aug. 17—A Milwaukee branch of the National Association of Purchasing Agents has been organized with a membership of nearly 100, representing as many of the leading industries of Milwaukee and eastern Wisconsin. Officers are: President, Floyd E. Francis, Patton Paint Co., Milwaukee; vice-president, G. H. Money, Federal Rubber Co., Cudahy; secretary, Charles E. Stone, Chain Belt Co. Milwaukee; treasurer, G. A. Platz, Horlick Malted Milk Co., Racine. Among the members are: W. V. Isgrig, Auto Parts Mfg. Co.; H. B. Ibson, Gemco Mfg. Co., Milwaukee; Robert Stiefoater, Aluminum Goods Mfg. Co., Manitowoc, and E. J. Eggert, Allen-Bradley Co., Milwaukee.

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2500 Tractors Operating in Pennsylvania

HARRISBURG, Aug. 17—According to figures furnished by the State Department of Agriculture there are approximately 2500 farm tractors at work in Pennsylvania and the total is increasing steadily week by week. In some districts the number has doubled recently and orders have been placed for many more.

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Stanley Porter, production manager of the Jackson Rim Co., Jackson, Mich., has resigned to return to the Hayes Wheel Co. of this city, in a similar capacity.

Ralph De Palma Wins Five Races

And Also Breaks Four World's Records at Sheepshead Bay

SHEEPSHEAD BAY, N. Y., Aug. 17—Not content with winning all five of the events on the card in the International Sweepstakes at the Speedway this afternoon before a crowd of nearly 50,000 spectators, Ralph De Palma succeeded in breaking world's records for 2, 10, 30 and 50 miles.

The new records, compared with the former fastest times are:

Distance	Time Today	Previous Record
2 miles	1.05:60	1.12:85 made by Resta last year.
10 miles	5.23:80	5.24:80 made by De Palma July 22 at Chicago.
30 miles	16.31:20	18.56:10 made by Aitken several years ago
50 miles	27.29:20	28.04:63 made by Resta last year at Sheepshead Bay.

De Palma's time for the 20-mile race this afternoon was 10:51.60, the still standing record of 10:50:20 being also to his credit.

The purse of $27,000 was divided into first, second, third and fourth prizes, the winner of each event receiving 6 points, the second 5 points, the third 4 points and the fourth 3 points. The table below shows the winners of the several prizes, the cars driven and the amounts gained by each driver.

De Palma drove consistently in all the events and as a rule lay in second or third place until close to the finish, when he spurted and passed the others. A notable fact is that there was not a single stop at the pits for tires or for other supplies by any of the cars which finished. The track was in first-rate condition and the starters were sufficiently few to insure perfect racing without crowding, combinations which led the spectators to anticipate the setting up of some new records. Nobody, however, could have prophesied that one man would break four records in a single day.

Flying starts were made in all races, with but a single false start, that of the first race.

Chevrolet experienced hard luck right away, breaking his crankshaft when about half way around the oval and putting his car out of commission for the day. In the second race Chevrolet, by arrangement, used Duray's car, but had to drop out in the fourth lap with a broken valve, a circumstance which prevented Duray from starting in the 50-mile race.

Owing to previous trouble at Columbus, Vail was unable to tune his car up in time for either the first or second race and although he started in the third his car was obviously not in first-rate form and he dropped out during the fifth lap. In the last race Vail was still having trouble and gave up when lapped by the leaders in the fifteenth.

During the progress of the events the spectators were thrilled by the daring evolutions of a biplane piloted by officers from Mineola.

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Radio Work Training Schools Established

WASHINGTON, Aug. 19—Training schools for radio work have been established by the Division of Military Aeronautics at West Point, Ky., and Camp McClellan, Ala., field artillery firing centers, and instruction work along these lines will eventually be extended to Ft. Sill, Okla., and Camp Jackson, S. C., and also to field artillery firing centers where observation schools of the Division of Military Aeronautics are now working in co-operation with the Artillery Branch of the Service.

Heretofore advance schooling was to be obtained only when the American troops reached France.

Instruction in radio covers wireless communication between the flyers in the air and the gun crews on the ground below. By means of radio the flyers are able to signal for barrages, the location of batteries, ammunition dumps, infantry, trains and other targets, and also to "spot" for its own particular battery, which means to tell that battery whether its shells are landing to the right or left, over or under the target at which it is firing.

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New Steel Hangars at Ellington Field

WASHINGTON, Aug. 19—Six new steel hangars, costing between $9,000 and $11,000 each, are being constructed at Ellington Field, one of the Gunnery Schools of the Air Service, at Houston, Texas. The new hangars will be used in connection with work in bombing which is soon to be started. Three hundred and thirty-three acres of land near Ellington Field have been secured for the bombing field.

Besides the main field known as Ellington, there are five auxiliary fields near Houston all of which are used in the training of fliers. New extensions include the utilization of land at Park Place and on the Gulf, near San Leon, Texas.

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Warner Gear Adds New Plant

MUNCIE, IND., Aug. 17—A contract has been let by the Warner Gear Co. for the erection of a large plant, to cost approximately $250,000.

The Results at Sheepshead Bay

Driver	Country	Car	Points	Prize
Ralph De Palma	Italy	Packard Special	30	$17,000
Ralph Mulford	United States	Frontenac Special	22	5,000
Dario Resta	England	Resta Special	19	3,000
Arthur Duray	Belgium	Frontenac Special	6	1,000
Louis Chevrolet	France	Frontenac Special	0	....
Ira Vail	United States	Hudson Special	0	....

Expect 25% Cars for 1919

Dealers Have Hearing with War Industries Board—No 100% Cut

WASHINGTON, D. C., Aug. 16—The National Automobile Dealers Association piloted by President E. W. A. Vesper assisted by Manager Ed. Peake and a score of leading automobile dealers and distributers waited on the War Industries Board here to-day with regard to the 100 per cent curtailment letter which the Board sent to the National Automobile Chamber of Commerce, and was able to have a very satisfactory hearing with the board.

The dealers' debut with the board opened up good possibilities of satisfactory working with it and the dealers came out of a 2-hr. hearing feeling that instead of the industry going to be cut 100 per cent there is every indication that the War Industries Board will curtail only what is necessary and that in all probability the makers will continue through 1919 on a 25 per cent basis as compared with 1917. It is possible that this percentage may be increased to 30 or higher.

Co-operation was the complete aim of the dealers in their working with the Board and they in turn were quite favorably impressed with the desire to co-operate with them on the part of the Board. The Board expressed a desire not to entirely stamp out the industry, which seemed to carry home the thought that the 100 per cent letter the Board sent to the N. A. C. C. was simply a reprisal for the N. A. C. C. members coming forward with a 50 per cent offer for 1919 before they had turned into the Board the steel inventories that the Board asked for in July.

The dealers were frank in all their transactions with the Board and made no effort to conceal any of their real intentions. They did not have to tell the Board about the utility of the automobile in the farming sections, as the Board has heard that so often that it is almost a delicate question with some of the members. From the dealers conference it is apparent the Board is quite fully advised on all facts relating to the industry.

While the board did not give any definite answer on what percentage the automobile industry would continue on for 1919 the attitude of the board was quite different from the general trend of its letter to the N. A. C. C., which would indicate that personalities are taking the place of sound business ethics in the dealings of the board and the N. A. C. C. The trouble seems to lie on both sides. Leaders in the War Industries board occasionally refer to the automobile industry as an unpleasant subject, one they apparently do not care to discuss. What the reasons back of this are can scarcely be deciphered. The dealings of the N. A. C. C. are to some extent responsible.

It was poor policy for the N. A. C. C. to ask for a 50 per cent bargain for 1919 when the War Industries Board was facing a steel shortage. The figures showed that 20,000,000 tons of steel were needed for the next 6 months and that the manufacturing capacity of the nation was only 16,500,000 tons. The War Industries Board could not possibly agree to a 50 per cent deal when faced with such figures, which figures, by the way, the majority of the steel makers have declared to be the closest to actual requirements that have been given.

It was because of this situation that the War Industries Board asked for the inventories rather than a specific bargain. Some have intimated that one of the objects of the board may have been to get an accurate line on the amount of steel held by the automobile concerns rather than to want the inventories for the purpose of balancing them and continuing the industry as long as possible at a possible maximum.

So long as the War Industries Board is confronted with a production of steel lower than government needs there is no possibility of a specific bargain, and under such conditions the better course would be that of getting every possible bit of steel to balance up inventories, thereby securing the greatest possible good out of the steel on hand.

Airship Divisions for Dayton

Technical Division Moves This Week—Engineering Also to Go

WASHINGTON, Aug. 20—The many reports that important divisions of both the Department of Aircraft Production and the Department of Military Aeronautics will be moved from Washington to Dayton are now assuming concrete form. The technical division of the Department of Military Aeronautics, headed by Colonel T. E. Bayne, will move its complete organization from this city to Dayton this week, where it will be located permanently. The engineering divisions of the Department of Aircraft Production, which is headed by Charles W. Nash, who also controls the production section, it is reported will be removed to Dayton shortly.

These moves, which have been advocated for sometime by AUTOMOTIVE INDUSTRIES, are expected by the Government officials to create more complete contact between closely allied divisions of the air service which have heretofore been separated by a thousand miles.

Dayton, it is pointed out, is practically the center of aircraft production and operation. It is close to Detroit, Indianapolis and Cleveland, has plane factories and fields itself, and thus, it is stated, will afford excellent opportunities for the technical and engineering divisions heretofore in Washington, to gain direct and practical knowledge, and to arrive at better understanding with the officials in the fields.

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Traction Engine Co. Builds Factory

BOYNE CITY, MICH., Aug. 16—The first factory unit of the Traction Engine Co., manufacturer of kerosene-gasoline engines for tractors and trucks, is under construction and will be completed within 30 days. The building is 65 by 130, and contains approximately 8500 sq. ft.

Agricultural States Leaders in Cars and Trucks

(*Continued from page* 311)

Illinois, Missouri, Michigan, Nebraska, North Dakota, Oregon, South Dakota, Washington and Arkansas. To these can be added Kentucky and Tennessee.

The actual registration gains in these different states follow:

Illinois	22,450
Pennsylvania	19,724
Missouri	18,974
Wisconsin	17,154
Michigan	17,019
Nebraska	11,499
North Dakota	6,121
Oregon	8,434
South Dakota	10,842
Washington	6,900
Arkansas	10,138
Kentucky	10,138
Tennessee	5,500

The registration gains in these agricultural states are more conspicuous in contrast with the greatly reduced gains in what might be designated manufacturing states and those containing large centers of population. New Jersey and Massachusetts, two leading manufacturing states, have been shown to have decreased. Maryland and Delaware, both essential manufacturing states, show very small gains, small compared with the corresponding period a year ago. Delaware has added 958 registrations and Maryland 2824. Connecticut, a leading manufacturing state and one that gained very heavily a year ago, has added only 1258 in the past 6 months. Rhode Island, essentially a manufacturing center, has added but 1257.

The manufacturing states that have gained heavily in registrations are those that cannot be termed more than quasi-manufacturing ones, all sharing very largely in agricultural pursuits and often mining as well. In this class are Michigan, very heavily reduced as compared with a year ago in new registrations, and Wisconsin and Illinois.

The percentage of gains in registrations in the past 6 months is largest with what can be designated the Solid South, which showed very heavy gains in January. These are continuing. The gains approximate 30 per cent for the area. Naturally the District of Columbia with its unprecedented increase in population since the war began is a leader with a gain of 15,771 as compared with a corresponding gain of 1470 in the first 6 months of 1917. Its percentage gain is 74. With the population of Washington increased approximately 100,000 it is not surprising that such a gain in registrations should have taken place.

Continuing with the Solid South, Alabama shows a gain of 11,986 as compared with 6749 a year ago in the same period. Florida has gained 4530 compared with 1770 last year. Georgia has gained 17,025 as compared with 12,225 in 1917. Other gains in the same period are: North Carolina 6121 as compared with 4656; West Virginia 5094 compared with 4646; Kentucky 10,143 compared with 7200; and in South Carolina and Mississippi the figures for this year are practically the same as those for last year. The influence of cotton and lumber in the South is strongly shown in these figures.

No other one section of the country has shown such a drop this year as New England which has a total of 7106 fewer registrations as of July 1 than a year ago. Two of these six states show losses and the gains of the other four are scarcely one-quarter of the total drop in Massachusetts and Maine. Vermont has increased by but 64; New Hampshire by 166; Rhode Island by 1257, and Connecticut by 1258. Two show a total loss of 9851 and the other four a total gain of but 2745. New England is essentially manufacturing as opposed to agricultural and here is one of the most convincing arguments as to where the cars sold in 1918 have gone to. The demand has been from the fertile acres of the Mississippi Valley rather than from the centers of population or the centers of manufacture. These automobiles have been going into 100 per cent utilitarian service and not into any so-called avenues of luxury.

What might be designated the mining states of the West all show a dropping off in registrations. There are six of these states and as a group they do not show so heavy a falling off as the manufacturing area of New England. The entire six have only added about 18,000 new registrations, not so many as the State of Missouri. The figures showing registration gains in the first half of this year are:

Arizona	1,914
Colorado	6,350
Idaho	4,080
Nevada	740
Utah	3,024
New Mexico	1,659

It is impossible to give complete and accurate registrations on motor trucks as many states do not segregate them from automobiles. Taking definite figures from those states that have them and obtaining estimates from others, a conservative estimate put the total number of trucks in use at 500,000. Until recently all of the trucks were used in the environs of the larger centers of population and in the smaller cities but the farmer has become a factor in truck buying and the truck is going onto the farm along with the tractor, the electric lighting outfit and the individual type of ice making machine.

Two Facts Emphasized

Further analysis of the registration figures for the several states emphasizes two indisputable facts:

One—The shortage of farm labor is compelling the continuance of the purchase of motor cars to such an extent that the farmer consuming time with the slow horse is being looked upon as a soldier of industry who is working below his possible and desirable capacity in these war days.

Two—The law of supply and demand is working out admirably in manufacturing and population centers where car sales have uniformly fallen off. This is convincing proof of the extent to which this part of our population has been supporting all forms of war subscriptions and indicates the natural falling off that must be expected due to the removal of the young men who have gone to France. It is an answer to the luxury argument of the automobile. It is a reminder to those who visualize the national aspect of the car from the streets and highways of our Atlantic seaboard, that the true picture of the automobile in its varied aspects of utility is found in the grain areas between the Alleghanies and the Rockies and on the Pacific slope beyond.

GAINS AND LOSSES BY STATES

State	1917 First 6 Mos.	1918 First 6 Mos.
Alabama	6,749	11,986
Arizona	5,278	1,914
Arkansas	9,496	10,138
California	36,250	69,052
Colorado	10,100	6,350
Connecticut	7,297	1,285
Delaware	2,037	958
Dist. Columbia	1,407	15,771
Florida	1,770	4,530
Georgia	12,255	17,025
Idaho	5,004	4,084
Illinois	33,700	22,450
Indiana	29,628	17,154
Iowa	70,393	46,787
Kansas	25,592	25,658
Kentucky	7,200	10,143
Louisiana	8,606	6,350
Maine	3,618	—1,961
Maryland	17,090	2,884
Massachusetts	6,061	—7,890
Michigan	40,361	16,019
Minnesota	30,500	—3,281
Mississippi	5,572	5,850
Missouri	19,218	18,974
Montana	7,415	4,601
Nebraska	26,941	11,499
Nevada	2,041	740
New Hampshire	4,532	166
New Jersey	44,253	—4,595
New Mexico	2,967	1,659
New York	66,530	11,903
North Carolina	4,656	6,121
North Dakota	12,705	5,831
Ohio	49,834	83,159
Oklahoma	19,782	—9,499
Oregon	10,682	8,434
Pennsylvania	35,925	19,724
Rhode Island	4,594	1,257
South Carolina	10,000	10,028
South Dakota	10,729	10,842
Tennessee	11,600	5,500
Texas	2,313	—5,161
Utah	3,683	3,024
Vermont	2,361	64
Virginia	9,694	9,339
Washington	5,736	6,900
West Virginia	4,646	5,094
Wisconsin	24,477	18,169
Wyoming	2,575	1,649

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Chalkis Co. 100 Per Cent Efficient

DETROIT, Aug. 20—According to information given out by the War Department the Chalkis Manufacturing Co. is one of the five gun plants credited with a 100 per cent complete machinery installation and in full operation. There are sixteen new gun plants for forging and machining of cannon on the official government list. In the erection of these plants the United States has expended $34,768,297, of which $607,993 is credited to the Chalkis concern. In all the sixteen plants in operation, cannon or cannon forgings for mobile artillery from 1½ in. to 10 in. are being produced.

A Priority Board Warning

Inadvisable and Useless to Employ Agents to Obtain Certificates

WASHINGTON, Aug. 16—Manufacturers and the public generally are advised of the uselessness and inadvisability of employing agents to obtain priority certificates or preferential treatment from the War Industries Board in an open letter by Edwin B. Parker, Priorities Commissioner of the Board. The letter follows:

"TO THE PUBLIC:

"The attention of the Priorities Division of the War Industries Board has been called to the fact that certain individuals are offering their services and soliciting employment to present priority applications and procure the issuance of priority certificates, and also to use their alleged influence in having industries accorded preferential treatment.

"The rules and regulations of the Priorities Division are clear, simple, can be readily followed and will be furnished to anyone applying therefor. The employment of agents not only burdens the applicant for priority with a wholly unnecessary expense, but an attempt on the part of such agents to exert personal influence—which it is needless to say they do not possess—may have a tendency to prejudice the applicant's cause.

"EDWIN B. PARKER,
"Priorities Commissioner."

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Former Texas Co. Engineer Dies from Exhaustion

WASHINGTON, Aug. 15—Capt. O. J. May of Chicago, an officer of the Equipment Division of the Signal Corps, and formerly lubrication engineer for the Chicago district with the Texas Co., died in consequence of the severe strain to which he was subjected in conducting a 65-hour test of a new oil for lubricating air engines.

Captain May conducted test after test until completely exhausted, and as a result his vitality was insufficient to withstand a severe cold caught a few days after the tests were completed. It is stated that his individual efforts have resulted in a very great saving to the Government, as the tests upon which he was engaged will provide the air forces with a satisfactory lubricant at a cost of but one-fourth of that formerly used.

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The Week's Flying Accidents

WASHINGTON, Aug. 16—Five deaths resulted from flying accidents at fields in this country during the week ending August 10. This was at a rate of one death for every 4408.5 hours flown, or 362,572 miles of air flying. The accidents occurred at:

Gerstner Field, Lake Charles, La.	1
Post Field, Fort Sill, Okla.	1
Scott Field, Belleville, Ill.	1
Taliaferro Field, Fort Worth, Tex.	2
Total	5

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Moline-Knight Prices Increased

EAST MOLINE, Aug. 15—Prices on the different Moline-Knight models have been increased as follows:

Model	Old Price	New Price
G—7-pass.	$2,375	$2,500
4-pass. de Luxe	2,375	2,500
C—5-pass.	1,750	2,000
L—4-pass. roadster	1,750	2,000
L—Touring sedan	2,280	2,500

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Will of Francis E. Stanley

NEWTON, Mass., Aug. 17—Francis E. Stanley, inventor of the Stanley steamer, who was killed in an automobile accident on July 31, left an estate estimated at approximately $500,000. In his will filed a few days ago he left $100,000 to his son, Raymond W. Stanley, and the rest of the estate to his wife.

Ford Plans Use of Water Power

Will Spend Millions of Dollars in Developing Resources of United States

DETROIT, Aug. 17—Henry Ford is credited with a scheme whereby the water power of the country will be utilized in connection with a number of Fordson tractor plants. The first factory to use water power will be located at Hamilton, Ohio, its cost being estimated at $25,000,000. Other plants, similarly operated, will be established throughout the country. The general plan involving the use of water power on a large scale will be developed at Hamilton and will be afterwards extended to other centers. Power derived from the Little Miami River at Hamilton will be sufficient to turn out 300 tractors per day during the winter months when the available water power is at its maximum. During the summer, when the stream is reduced, the plant is to be used for melting steel with the aid of electricity.

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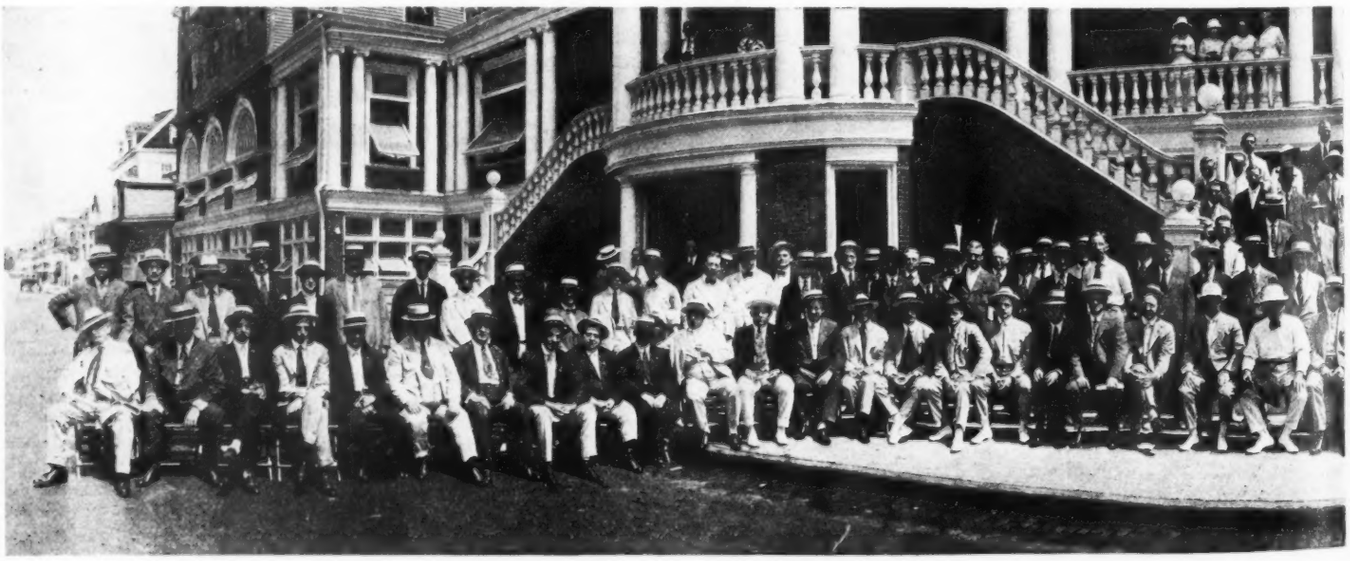
President of M. A. M. Confers on War Service Committee Duties

NEW YORK, Aug. 16—In addition to general routine matters discussed at a meeting of the executive committee of the Motor and Accessory Manufacturers held to-day, plans in connection with the possible activities of the War Service Committee were considered with the result that president C. W. Stiger has arranged to go to Washington for the purpose of conferring with the Chamber of Commerce of the U. S. A. as to the best ways in which this committee can assist the Government.

Early in September Mr. Stiger will call a joint meeting of both the executive and



270 jobbers and manufacturers attended the Bicycle and Motorcycle Convention held during the first week in *vention of the*

the war service committees, probably at Detroit, to give effect to the results of his interview at Washington. It has not been definitely decided whether or not the Motor and Accessory Manufacturers shall have a permanent representative at Washington.

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War Department Gives Manufacturers Information on Contracts

WASHINGTON, Aug. 16—In order that the manufacturers can learn full information regarding the needs of the War Department, the General Staff will place manufacturers on the mailing list and send each of them requests for bids for the products which he is able to provide. Manufacturers, in sending in their names to the Supply Bureau, Director of Purchases and Supplies, General Staff, U. S. Army, Washington, D. C., should also include satisfactory references from banks or reputable business concerns, or from the chairman of the Local Regional Manufacturers Organization associated with the War Industries Board.

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Starting Device Adapted to Aircraft Engines

MILWAUKEE, Aug. 17—A starting device for heavy duty engines, designed several years ago by Nels A. Christensen, a noted inventor and engineer of Milwaukee, principally for application to motor fire apparatus and similar purposes, has been refined by him to suit the requirements of aircraft. Several hundred hydroplanes in use at the navy aviation camp at Great Lakes, Ill., have been equipped with the starter. Mr. Christensen personally superintended the installations and made numerous practice flights to demonstrate the efficacy of the apparatus. He is president and general manager of the Christensen Engineering Co., 816 First National Bank Building, Milwaukee.

Improved Methods of Shipping Airplanes

Close Study of Problems Has Resulted in Saving Overseas Freight Space

WASHINGTON, Aug. 19—Shipment overseas of American built airplanes has been considerably improved by the Aircraft Production Board as the result of studies in plane boxing and shipping problems. Shipment of American De Haviland bombing planes, for example, as now made, saves 644 cubic feet of space over the former methods for each airplane sent. This amounts to a cost saving of $3,864 per plane, figuring shipping space at $6 per cubic foot. In addition, 1000 board feet of lumber is saved in the boxing. Mine packing boxes are used to ship 4 battle planes. The gross weight of the 4 planes is 11,000 lb., and when packed, 27,000 lb. Four of the 9 boxes contain front sections of the fuselage. One contains 4 rear sections; 2 hold 2 sets of wings each; 1, 4 sets of rear controls, and 1 set of ailerons. The total space required for 4 planes so crated is 3547 cu. ft. In addition to the parts actually required to complete the 4 planes, spare parts are shipped. Two main wing boxes are sent with each unit shipment of 4 planes, and contain besides the wings with their fittings, axles, wing skids, landing gears, wiring plates, wheels, tires, struts and fittings. One aileron box is included with each shipment of 4 planes.

Shipment of spare parts for 100 De Haviland planes required 105 cases weighing 164 tons. With every plane there are also shipped 2 Marlin synchronizing machine guns operated by the pilot, 2 Lewis flexible machine guns operated by the gunner, camera, attachments for radio set, heating and lighting equipment, bombing equipment, air pressure gages, oil pressure gages, aneroid barometer, clock, compass, map case, fire extinguisher, safety belts, Very signalling pistol, etc.

All boxes are lined with water-proof paper and the tops covered with tarred felt fastened down on the sides and ends. All the joints are sealed with cement and the exteriors are given two coats of paint. Minute directions are given for packing the various parts of the airplanes. Braces and supports within the box are so constructed as to support the engine and fuselage. Metal parts which might corrode are protected by a neutral slushing compound which is resistent to the effects of sea air and salt water. The instruments on the instrument board are heavily covered with a coating of paraffine, the more delicate instruments being removed and packed carefully in special boxes which in turn are sealed in air-tight tin boxes.

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Wages Increase in May—Number of Employees Practically Unchanged

WASHINGTON, Aug. 16—Wages in the automobile manufacturing industry increased 7.1 per cent for the manufacture of May, 1918, as compared with the manufacture of April, 1918, according to the reports of 48 factories. The number of employees for the same period remains approximately the same, with 114,979 employed in 48 factories in April, 1918, and 114,944 in May, 1918, a decrease of less than one-tenth of 1 per cent. The wages paid by the 48 companies to 114,944 employees in May, 1918, were $3,015,637.

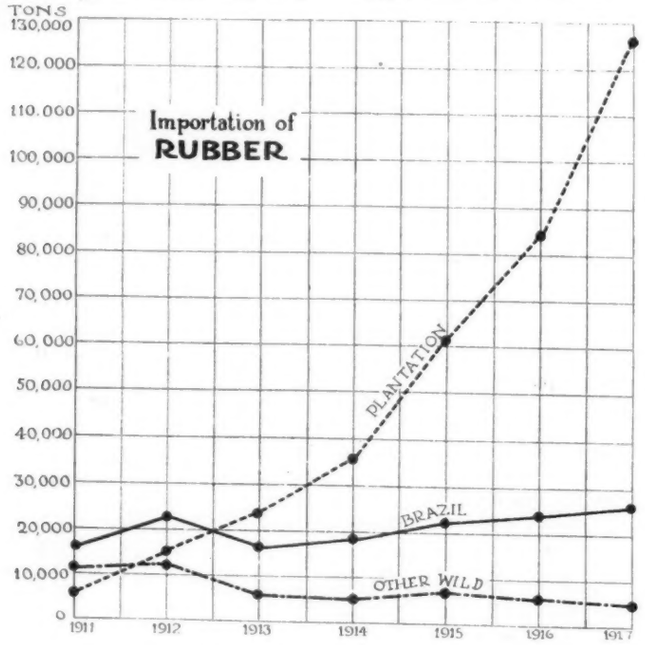
Forty-seven automobile companies reported 120,000 workers in May, 1917, as against 114,745 workers in May, 1918, a decrease of 4.5 per cent, while wages increased from $2,773,654 for the manufacture of May, 1917, to $3,011,044 for May, 1918, a wage increase of 8.6 per cent or a total wage increase counting the decrease in workers of 11.1 per cent.

August at Atlantic City. Over 50 manufacturers of automobile parts were present at this, the largest, conkind ever held

AUTOMOTIVE MATERIALS MARKETS

Materials Market Prices

Acids:
Muriatic, lb. ..... .02-.03
Phosphoric, et. ... .35-.39
Sulphuric (60), lb.. .09
Aluminum:
Ingot, lb. ..... .33
Sheets (18 gage or more), lb. ..... .40
Antimony, lb. ..... .13⅞-.14⅛
Burlap:
8 oz., yd..... .19
10 oz., yd..... .24½
Copper:
Elec., lb. ..... .26
Lake, lb. ..... .26
Fabric, Tire (17¼ oz.):
Sea Is., combed, lb.1.65-1.70
Egypt, combed, lb.1.25-1.35
Egypt, carded, lb..1.20-1.30
Peelers, combed, lb.1.05-1.20
Peelers, carded, lb. .95-1.05
Fibre (⅛ in. sheet base), lb. ..... .50
Graphite:
Ceylon, lb. ..... .07½-.25
Madagascar, lb. .. .10 -.15
Mexican, lb. ..... .03¾
Lead, lb. ..... .08-.09
Leather:
Hides, lb. ..... .18-.35¼
Nickel, lb. ..... .40-.43
Oil:
Gasoline:
Auto., gal. ..... .24½
68 to 70 gal..... .30½
Lard:
Prime City, gal..2.30
Ex. No. 1, gal....1.60
Linseed, gal. 1.88-1.90
Menhaden (Brown), gal. 1.20-1.22
Petroleum (crude),
Kansas, bbl. 2.25
Pennsylvania, bbl. 4.00
Rubber:
Ceylon:
First latex pale crepe, lb. ..... .63
Brown, crepe, thin, clear, lb. ..... .60
Smoked, ribbed sheets, lb. .... .62
Para:
Up River, fine, lb. .68
Up River, coarse, lb. ..... .40
Island, fine, lb.. .59
Island, coarse, lb. .27
Shellac (orange), gal. .70-.76
Spelter ..... .09¼-.09½
Steel:
Angle beams and channels, lb. .... .03
Automobile sheet (see sp. table).
Cold rolled, lb..... .06½
Hot rolled, lb..... .03½
Tin ..... .88
Tungsten, lb. 2.40
Waste (cotton), lb... 12¾-.17



Imports of cultivated, Brazilian and other wild rubber during the past seven years. Note the abnormal increase in cultivated rubber as the plantations developed

AUTOMOBILE SHEET PRICES

(Based on No. 22 Gage. Other gages at usual differentials)

	Primes only Per 100 lbs.	Primes when seconds up to 15 per cent are taken Per 100 lbs.
Automobile body stock	$5.95	$5.85
Automobile body stock, deep stamping	6.20	6.10
Automobile body stock, extra deep stamping	6.45	6.35
Hood, flat fender, door and apron, or splash guard stock	6.05	5.95
Crown fender, cowl and radiator casing, deep stamping	6.30	6.20
Crown fender, cowl and radiator casing, extra deep stamping	6.55	6.45

Automobile Sheet Extras for Extreme Widths:
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lb.
Nos. 19 and 21 over 36 in. to 44 in., 30c. per 100 lb.
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lb.
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lb.
Black Sheet Extras to Apply to Narrow Widths:
Oiling, 10c. per 100 lb.
Patent leveling, 25c. per 100 lb.
Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.
Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co	62	64	— ¼
*J. I. Case T. M. Co., pfd	..	84	..
Chalmers Motor Co., com	4½	5½	+1
Chalmers Motor Co., pfd	20	30	—10
*Chandler Motor Co	86	89	—2½
Chevrolet Motor Co	132	137	—2
*Fisher Body Corp., com	36½	37	—1
*Fisher Body Corp., pfd	90¼	91	+1¼
Fisk Rubber Co., com	59	63	—1
Fisk Rubber Co., 1st pfd	99	103	—1
Fisk Rubber Co., 2nd pfd	78	83	..
Firestone Tire & Rubber Co., com	106	110	+2
Firestone Tire & Rubber Co., pfd	..	..	..
*General Motors Co., com	153	154½	..
*General Motors Co., pfd	81¼	81¾	— ¼
*B. F. Goodrich Co., com	45¼	45¾	..
*B. F. Goodrich Co., pfd	98½	100	..
Goodyear Tire & Rubber Co., conf	152	157	—7
Goodyear Tire & Rubber Co., pfd	97½	98½	+ ⅜
Grant Motor Car Corp	3	3½	+ ¾
Hupp Motor Car Corp., com	3	3¼	..
Hupp Motor Car Corp., pfd	79	82	..
International Motor Co., com	25	32	—3
International Motor Co., 1st pfd	60	65	+5
International Motor Co., 2nd pfd	35	42	..
*Kelly-Springfield Tire Co., com	49	50½	..
*Kelly-Springfield Tire Co., 1st pfd	80	87	..
*Lee Rubber & Tire Corp	22	23	+ ¼
*Maxwell Motor Co., Inc., com	25¾	26	— ¼
*Maxwell Motor Co., Inc., 1st pfd	54½	55½	— ½
*Maxwell Motor Co., Inc., 2nd pfd	19½	20	— ¾
Miller Rubber Co., com	105	110	—5
Miller Rubber Co., pfd	95	98	—1½
Packard Motor Car Co., com	110	120	..
Packard Motor Car Co., pfd	94	97	+2
Paige-Detroit Motor Car Co	17	19	..
Peerless Truck & Motor Corp	14	16	+1
Portage Rubber Co., com	110	112	..
Reo Motor Car Co	14	15	— ½
*Saxon Motor Car Corp	6¾	7	+ ¼
Standard Motor Construction Co	13	13½	+1
*Stewart-Warner Speed. Corp	56½	57½	—1
*Studebaker Corp., com	44¾	45⅛	..
*Studebaker Corp., pfd	85	90	..
Swinehart Tire & Rubber Co	46	55	—4
United Motors Corp	31½	32	— ½
*U. S. Rubber Co., com	61	61¼	..
*U. S. Rubber Co., pfd	104¼	104¾	— ¾
*White Motor Co	46½	48	+3¼
*Willys-Overland Co., com	19⅜	19½	— ½
*Willys-Overland Co., pfd	82⅛	83½	— ⅛
Standard Parts	55	65	..

*At close of business Aug. 18. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS	Bid	Asked	Net Ch'ge
Auto Body Co	..	7¾	..
Bower Roller Bearing Co	..	18¼	..
Chevrolet Motor Co	133	136	—3
Continental Motor Co., com	5¼	5½	— ⅛
Continental Motor Co., pfd	94½	..	— ¼
Edmund & Jones, com	14	17	..
Edmund & Jones, pfd	75	90	..
Ford Motor Co. of Canada	147	..	..
Hall Lamp Co	..	14½	..
Michigan Stamping Co	..	..	..
Packard Motor Car Co., com	..	121	..
Packard Motor Car Co., pfd	..	94¼	..
Paige-Detroit Motor Car Co	..	18¼	..
Prudden Wheel Co	..	11¼	..
Reo Motor Car Co	14⅝	14¾	+ ⅝
INACTIVE STOCKS			
Atlas Drop Forge Co	..	25	..
Kelsey Wheel Co	25	..	..

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Bituminous Production Recedes Steadily

In the face of ever-increasing demands for bituminous coal, production recedes steadily week by week from the 13,286,000 net tons reported in the record-breaking week ended July 13. Estimates made at the beginning of the coal year for the tonnage of fuel necessary for essential uses have proved to be too low, the latest revised figures showing that every possible effort will have to be made by the coal-mining industry if the war program is not to suffer a setback. The requirements for the Navy, for instance, were originally fixed at 3,500,000 net tons for the year. It now is estimated that Uncle Sam will need at least 8,000,000 net tons for his vessels before the end of 1919.

An idea of how fast the Navy is consuming fuel may be had from the fact that the demand in July from this source had risen to a 6,000,000-ton-a-year basis. The shipyards, too, are speeding up production to such an extent that the 10,000,000 net tons considered a liberal allowance for the Shipping Board on April 1 have been increased by 3,000,000 tons. Another phenomenal increase is in the demand for bunker fuel. At the beginning of the coal year 13,500,000 tons were assigned for this purpose, with the thought that this amount would prove adequate. The estimate has now risen to 21,000,000 tons. When to the foregoing figures is added the coal needed by plants that have been enlarged, and the additional fuel required to keep a large percentage of industries operating on a 24-hr. basis, it can be seen that the problem confronting the soft-coal mines is one of no mean proportions.

For the week ended Aug. 10 (the latest statistics available), the output of bituminous coal is estimated at 12,274,000 net tons. This means an average production of 2,046,000 net tons a day for this period, which is 54,000 net tons below the daily output established as a minimum. To emphasize the seriousness of the situation still further—the soft-coal mines are now 14,500,000 net tons behind schedule, and it is a foregone conclusion that they will never catch up.

The causes for the fall in output seem to be divided between car shortage and labor unrest, with the greater part of the blame attaching to the former. Record production can only be achieved when the railroads manage to keep an adequate number of empty coal cars moving to the mines and the transportation of loaded cars is speeded up. This statement is substantiated by the fact that the peaks in the coal production chart result when the railroads operate at maximum efficiency. Operations in the Pittsburgh district are short of 200 cars a day, and on Aug. 16 many of the mines in that region were at a standstill for want of cars. In the Kanawha and Coal River districts of West Virginia car shortage was responsible for the loss of 1347 productive hours during the week ended Aug. 10. In Alabama, too, the lack of cars caused a decided decrease in output.

Despite reduced labor forces, the output of anthracite coal continues to keep well ahead of the quantity mined last year. Hard coal shipments during the week ended Aug. 10 totaled 2,051,933 net tons, a decrease of 6.4 per cent compared with the week preceding. The total output of anthracite coal in July amounted to 7,084,775 tons, an amount exceeded only twice before; but what is even of more importance, virtually the entire tonnage of anthracite mined for the first quarter of the coal year—April to July—is in the hands of the consumer.

Nothing should be tolerated that will interfere with anthracite production if the public is to be supplied with coal. There is evidence that Hun propaganda is rife in the hard-coal regions—in the shape of both covert and open acts calculated to create discord in the labor ranks. The mining force should by every possible means be maintained at its present figure.

Shipments of soft coal to the lakes grow more and more disappointing. It is feared that the Northwest will not get over 25,000,000 tons, instead of the 28,000,000 aimed at. The first eleven days of August saw lake shipments of bituminous—exclusive of vessel fuel—only 1,535,996 tons. The Fuel Administration schedule calls for 4,900,000 tons. July closed 1,000,000 tons behind, and it appears that August will add about 1,250,000 tons to this deficit. For the week ended Aug. 17 the estimate of shipments to the Northwest is 1,020,000 tons. The Pittsburgh district has not been able to respond to the 1600-car-a-day order, due to the unsatisfactory car supply referred to earlier in this review and a marked shortage in motive power—*Coal Age.*

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Garford Prices Advance

LIMA, OHIO, Aug. 20—The Garford Motor Truck Co. increased the prices of its trucks and tractors on Aug. 15 as follows:

TRUCKS

Model	Ton Chassis	Old Price	New Price
75 C	1	$2,100	$2,500
66 B	1½	2,500	3,000
66 BL	1½	2,600	3,100
70 B	2	3,000	3,300
70 BL	2	3,100	3,400
77 B	3½	3,900	4,300
77 BL	3½	4,000	4,400
68	5	4,700	5,000
68 L	5	4,800	5,100
69	6	4,900	5,300
69 L	6	5,000	5,400

TRACTORS

Model	Ton Tractor	Old Price	New Price
70 B	4½	3,100	3,400
77	7	4,000	4,400
68	10	4,800	5,100

Prepare to Meet Demand for Industrial Steel

The meeting of the special sub-committee of steel manufacturers with Government representatives at Washington on Thursday, Aug. 22, and the calling of a general meeting of steel manufacturers in New York for the following Wednesday point to the taking of new and important steps to meet the demand for ship, munitions and railroad steel.

Coal and coke supply still limit pig iron and steel output. The continuance of an adequate labor supply under the new call for fighting men is a serious problem, and even more grave is the situation caused by the set purpose of labor leaders to bring about union control of the steel industry.

Washington is not so much concerned about the construction of new iron and steel capacity, which would be from 12 to 18 months in the building, as about getting the full fighting effect of existing plants. It is certain, therefore, that in the remainder of the year the changes in metal-working industries due to concentration on war work will be more marked than they have been in the past six months.

The situation as to coal and coke and transportation does not measure up to the enlarged requirements of the war. With an average of 360 blast furnaces operating last month, the pig iron output was 110,000 tons a day. With an average of 335 furnaces operating in April, May and June of last year (25 less than in July, this year) the pig iron output for those three months also averaged 110,000 tons a day. Thus 25 more furnaces are required now to keep output up to the rate of last year.

The pig iron shortage complained of for months grows more acute; but the proposal from Washington that the few remaining cold furnaces be started up will come to little. Operators of some of the small furnaces now blowing, particularly in the South, threaten to put them out if the pig iron price is not advanced by October.

Pig iron allocations in the week have been relatively small. Pending demand includes a round lot wanted for the first 500,000 semi-steel shells to be made for the Government.

The unusual pressure for production is shown in the placing with wire makers of a good percentage of the 82-mm. rounds wanted for shells to be shipped this month to France. Putting the lighter billet mills of these plants on munition steel will mean for the time being a very limited output of wire as the rate for months has been only about 60 per cent of normal.—*Iron Age.*

Taxation of Cars Protested

A.A.A. Presents Facts and Figures on Subject to Ways and Means Committee

WASHINGTON, Aug. 19—Less than 3 per cent of all of the motor vehicles produced in 1917 sold at $2,500 or more. On the Cleveland-Akron Highway, of 13,979 vehicles traveling over the road in a week, only 685 were horse-drawn, and more than 2000 were motor trucks carrying 5014 tons of freight, which was only slightly less than 6630 tons hauled in the same week by the 3 railroads. Thirty-three thousand people were transported by the 10,000 passenger cars. These figures and others asserting the importance and essentialness of the automobile industry, and in protest to direct Governmental taxation on motorists, were placed before the Ways and Means Committee this week by Dr. David Jameson, President of the American Automobile Association. Dr. Jameson asserted that it would be as fair to tax coal as gasoline, and referred to the fact that any tax on new cars would be passed along to the consumer. He also contended that any tax on the original cost of used cars would be unjust. This proposed tax on new cars has been changed since Mr. Jameson filed his communication, and is now based on horsepower. Dr. Jameson's letter follows:

"As the spokesman in an organized form of the motor car owners of the country, we did not seek a hearing before your committee, as we are of the opinion that the present comprehensive use of the automobile is entirely clear to all of you. There are a few points, however, we would like to bring to your attention.

Farmers Biggest Buyers

"Of the 1,798,600 motor vehicles produced in 1917, less than 3 per cent sold at $2500 or upwards. Three out of every four cars cost not over $1200. These 1,365,000 represented 75 per cent of the total. Every other car was a certain popular make selling close to $500. Farmers were the best buyers as a class, absorbing 53.1 per cent of the total vehicles manufactured.

"Our investigations recently by chairmen of good roads, legislative, and touring boards support anew the contention that the passenger automobile is now nine-tenths for utility and scarcely one-tenth devoted to what has been designated as "pleasure riding." True it is that vacation periods may be spent in the form of interstate road journeys and there may be local evening and Sunday trips, but the fact remains that a preponderating percentage of the car's mileage is employed by members of the family to crowd more work into one day than was ever before possible.

"If your committee decides that there should be substantial taxation of an essential like highways transportations—and all forms are considered—we shall accept without protest your findings, believing that war revenue necessities demand such action.

"Railroad conditions have compelled an increasing use of the highways, to the extent that long distance traveling is more general than in previous years. The figures come to us through the distribution of thousands of maps by the road bureaus at our national headquarters in Washington and New York, besides which we supply our several hundred clubs in all parts of the country.

"One illuminating example of what can be done where a highway is constructed capable of meeting maximum traffic demands exists in a forty-mile stretch of Ohio road connecting Cleveland and Akron. A census for a week taken in March by students of the Case School of Applied Sciences gave a total of 13,979 vehicles, of which only 685 were horse drawn. Fifteen per cent of the total were motor trucks, which carried 5014 tons of freight, compared to 6630 tons shipped by three railroads. Thirty-three thousand people were transported in passenger automobiles.

"Proposed levies upon users of gasoline motors and engines would amount to about one-quarter of a billion dollars. Purchasers of new cars, of course, would pay the tax imposed on the dealer, who would pass it along to the consumer. The gasoline tax would be determined by the car's mileage, which undoubtedly would be reduced to a minimum. A federal license tax in addition to that now imposed in all states is manifestly unfair, and especially so if based on the original price of the automobile. All these would be largely a tax on industry and would seem unreasonably excessive on one branch of industrial activity, already taxed heavily by the states.

"The proposed tax will hamper the agencies of production, the fuel and the power they employ. We might as well tax coal as gasoline, which is doing more than any other agency to relieve the conditions resultant upon the scarcity of coal. It is estimated that the power generated by gasoline exceeds that generated by coal and steam nearly ten to one; the horsepower produced by steam being estimated at about 11,000,000 and that of gasoline at over 100,000,000.

"In these days, when our social system is on trial, one of the chief concerns of the Congress should be the safeguarding and the promotion of the sources of national wealth. this to the end that we may endure the great and prolonged strain to which the war will subject us. Industry is the greatest source of national wealth. Is it good economics to tax this greatest source of power known to American industry? When we tax fuel, we tax industrial life at the very source of its vitality.

"In conclusion, might we again call notice to the present excessive taxing of motor cars in practically all states, which in some instances includes registration of car, its listing in the personal property tax, and the necessity of paying for an operating license for each member of the family who drives the vehicle. Surely it is even now a plenteously taxed necessity.

"Furthermore, the motor car owner is a citizen, and, as such, meets other civic obligations and pays whatever general taxes are imposed. He, however, senses unfairness in being conspicuously singled out every time there comes need for revenue increases."

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March Aids Wisconsin Rural Express Lines

MILWAUKEE, Aug. 19—Alton J. March, head of the A. J. March Motor Truck Co., 215 Wisconsin Street, Milwaukee, and president of the Milwaukee Automobile Dealers' Association, has accepted appointment as Wisconsin representative of the national motor truck committee of the National Automobile Chamber of Commerce and already is making preliminary arrangements for the establishment of rural motor express lines in this State. Mr. March has enlisted the support and co-operation of the State and Milwaukee Councils of Defense; Milwaukee Association of Commerce, Milwaukee Chamber of Commerce, Wisconsin Highway Commission and numerous other organizations to work out a plan of operation to be put into effect immediately.

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Aviation Gunnery Fields Leased

WASHINGTON, Aug. 19—Several fields are being leased by the War Department for the extension of instruction in gunnery for aviators in order that they may be trained on this side of the Atlantic. One tract of 10,000 acres has been leased near Fort Worth, Texas, not far from Taliaferro, Barron and Caruthers Field. Another tract of 750 acres has been leased near Lufbery Field, L. I.

Enough Cotton Fabric for Planes

U. S. Production Averages 1,200,000 Yards per Month —Sufficient for All Needs

WASHINGTON, Aug. 19—The production of American cotton airplane fabric is now averaging about 1,200,000 yards monthly, sufficient for all requirements, and capable of being largely increased if necessary. No more linen fabric is being imported from abroad for this purpose, and after the imported stock now on hand is exhausted, cotton fabric will be used exclusively in covering American airplane wings.

At the outbreak of the war in 1914, linen was the only material which had proved entirely satisfactory for covering airplane wings, the essential physical properties required being lightness in weight, proper absorption of dope and strength and resistance to tear.

The chief countries before the war producing flax for fine grades of linen were Belgium, Russia and Ireland. The Belgium supply was cut off from the Allies in 1914. Russian flax was difficult to obtain and was later cut off entirely. In the meantime the consumption of linen for war purposes had increased enormously. By the spring of 1917, when the United States entered the war, the linen situation was very serious and it was obvious that some substitute would have to be found.

In developing a cotton airplane fabric which would have the necessary qualities of the linen, the U. S. Government received the greatest assistance from the various cotton mills.

Samples were made from cotton of many constructions and numbers of yarn, varying from No. 40 two-ply to No. 100 four-ply, the cloth having from 50 to 90 threads per inch. Yarns were in some cases mercerized under tension and various twists were tried. Several cotton mills co-operated in this work.

When the new fabrics were secured, samples were put on airplanes, "doped" and varnished, according to regulation practice, and tested in actual use at Langley Field and Pensacola. Flying tests were also made with several other varieties of fabric. The tests were for three months of service, averaging ten hours per day. Members of the U. S. Air Service, members of the foreign flying corps and other experts assisted in the experiments. They reported that the cotton fabrics developed in the United States appeared to serve most favorably. Other very favorable reports have recently been received from tests made in Great Britain on American cloth sent over there.

After many experiments had been made, the first contracts for 10,000 yards each of cotton airplane fabric were placed in the middle of September, 1917. The results obtained were satisfactory and it was decided to place further contracts.

Two fabrics were adopted, the specifications calling for a strength of not less

than 80 lb. per inch in both warp and filling. The cotton used had to be of a very long staple and in November, 1917, the Air Service purchased 15,000 bales of long staple Sea Island cotton.

The first quantity orders for cotton airplane fabric were placed in October and November, 1917, and were for 1,280,000 yards of Grade A and 200,000 yards of Grade B. Deliveries of cotton airplane fabric started in January with the production of 173,000 yards. Production has gradually increased until at the present time 1,200,000 yards are being produced monthly.

Subsequent contracts have been let for cotton airplane fabric amounting to 11,513,084 yards. All of these later contracts, however, have been for Grade A cotton fabric, as it now seems clear that this cloth is superior to the other.

While the cotton airplane fabric was at first used only for training planes, and the Grade A standard linen fabric, which was imported from Great Britain, was used for combat planes, it was decided in April, 1918, that the Grade A cotton fabric could be used for all types of planes.

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Draft Is Not a Factor in Industrial Disputes

MILWAUKEE, Aug. 17—Because of a report that an employer at Madison, Wis,. involved in labor difficulties, attempted to use the deferred classification of employees under the selective draft service act as a leverage upon their industrial status, Gov. E. L. Philipp and the draft administration of Wisconsin have issued an official statement condemning this "reprehensible practice" and assuring the public that the draft will in no way be permitted to become a factor in industrial disputes. It is announced that a striking employee will be given a reasonable time to find employment similar to his present work so that he may continue in his deferred classification. The period will be about ten days, at the end of which time reclassification will be considered.

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Crude Rubber Imports Limit for August and September

WASHINGTON, Aug. 16—Importation of crude rubber has been limited to 16,666 tons for the months of August and September. This is proportionate to the rate tentatively fixed by the War Trade Board for the quarter ending July 31, 1918, which was 100,000 tons per year. The rubber imports for August and September will be allocated by the Bureau of Imports along the general lines of the previous allocation, with certain changes to take care of increased Government requirements.

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Republic Rubber Co. Declares Dividend

YOUNGSTOWN, OHIO, Aug. 19—The Republic Rubber Co., Youngstown, Ohio, has declared its regular quarterly dividend of 1¾ per cent on first preferred stock, payable Sept. 1 to stockholders of record Aug. 25.

Gasoline Production Well Maintained

June Totals Slightly Below Those of May, but Daily Production Greater

Production

	June, 1918	May, 1918
Crude oil (bbl.)	28,140,479	28,510,698
Gasoline (gal.)	315,023,445	319,391,160

Stocks on Hand

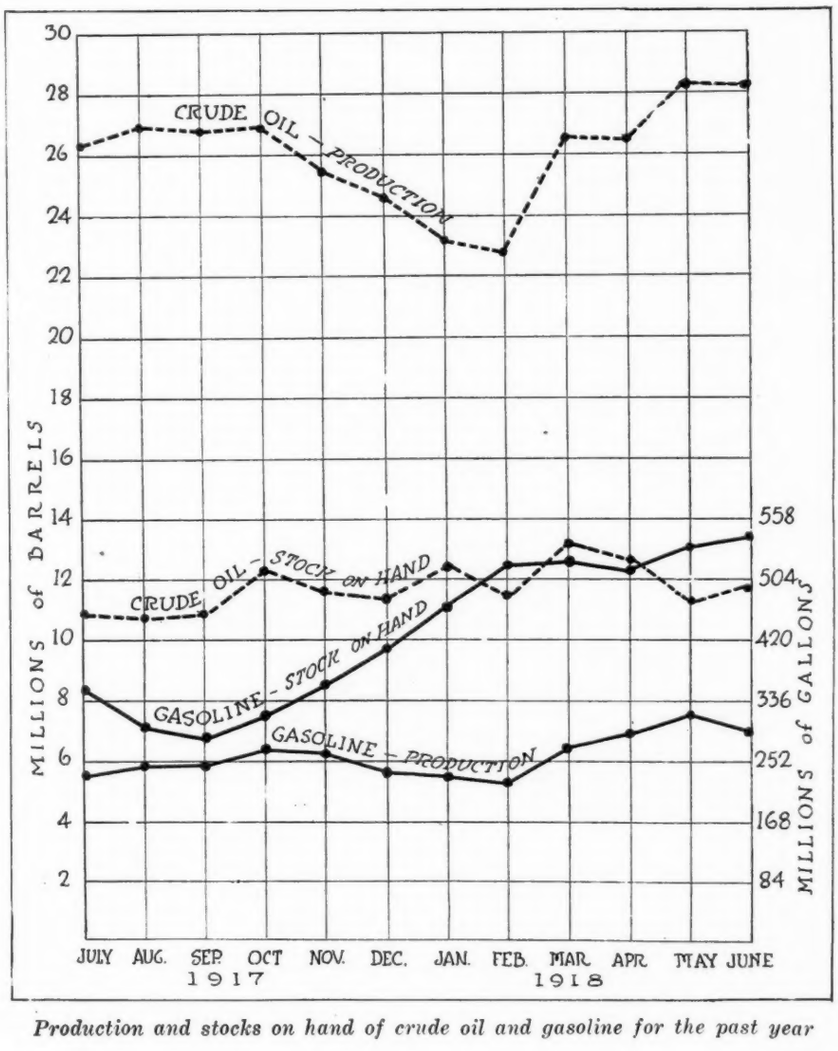
	June 30, 1918	May 31, 1918
Crude oil (bbl.)	11,956,151	11,824,633
Oils purchased to be re-run (bbl.)	932,561	872,300
Gasoline (gal.)	418,440,353	460,637,479
Kerosene (gal.)	426,285,676	343,311,945
Gas and fuel (gal.)	550,704,759	515,020,224
Lube (gal.)	158,316,257	161,009,729
Wax (lb.)	169,424,428	168,171,328
Coke (ton)	17,478	15,583
Asphalt (ton)	97,631	104,214
Miscellaneous (gal.)	273,877,024	317,115,697

WASHINGTON, Aug. 16 — During June, 1918, the average daily production of gasoline was 10,500,781 gal., an amount slightly in excess of the daily production average for May, although the total production for the latter month, as shown in the table, was slightly greater than that of June. This apparent anomaly is accounted for by the fact that there are 31 days in May as compared with 30 in June.

According to the figures just issued by the Bureau of Mines the stock of gasoline on hand on June 30 was 418,440,353 gals., as against a stock of 460,637,479 gals. at the end of May. The total of April 30 was still larger, being 509,197,134 gals. Taking the season and the additional demand into consideration, these stock figures are perfectly normal.

Production of crude oil has dropped slightly, the June figures being 28,140,479, as against 28,510,698 gals. during May. The item "Oils Purchased and Re-run" given above is not a figure which can be properly added to actual crude production figures, as it is understood to represent crude or distillate which has at some previous date been included in the regular crude production figures. Nevertheless, these additional 3,483,270 gals. are available.

The remaining items shown in the tabulation herewith show both production and stock of crude oil and gasoline and the stocks on hand of the derivatives of the former as on the last day of each of the two months.



Production and stocks on hand of crude oil and gasoline for the past year

George E. Flanders Enlists

George E. Flanders, son of Walter E. Flanders, president of the Maxwell Motor Co., Inc., Detroit, has enlisted as a private in the United States marines at the age of 18, and is now stationed at Paris Island.

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Dr. Clyde Leeper, medical director of the social service work of the Goodyear Tire & Rubber Co., and in charge of the anti-tuberculosis work of the Red Cross, has been appointed one of the physicians who will have charge of Red Cross anti-tuberculosis work in Italy. He is scheduled to sail the latter part of this month.

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William H. Armstrong, for eight years holding executive positions in the Mitchell Motors Co., Racine, Wis., and its predecessor, the Mitchell-Lewis Motor Co., has resigned as secretary and treasurer of the company to take the active management of the Armstrong Foundry Co., Racine, the recent re-organization of the Holbrook-Armstrong Iron Co. of that city. Mr. Armstrong has been elected president.

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A. W. Voege of Detroit has been appointed assistant to Maurice Rothschild, general manager of the Regal Motor Car Co., Detroit, who is formulating plans to reorganize the company for the start of manufacturing at close of the war.

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J. H. Morrill formerly in charge of the engineering department of the Northway Motors Co., Detroit, has been appointed assistant chief engineer of the Buda Motor Co., Harvey, Ill.

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Dr. Orrel A. Parker, manager of the wheel department of the Hydraulic Pressed Steel Co., Cleveland, has been placed in charge of records under W. F. Parrish, chief of the oil and lubrication branch, supply section, in the office of the director of military aeronautics.

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To Regulate Crude Oil Prices

WASHINGTON, Aug. 20—Prices of gasoline and other oil products will be stabilized, and steady production of petroleum will be assured by a plan now being worked out by the National Petroleum War Service Committee in co-operation with the United States Fuel Administration. Maximum premiums will be arranged for payments for various qualities of oil.

Heretofore competition has caused various refiners to bid against each other and pay excessive premiums over the base rate for oil. This has resulted in exorbitant consumer's prices, and has also created disturbance in the oil industry, frequently hampering oil production.

By means of the maximum premiums it is expected that permanent prices for crude petroleum will prevail and that its proper production and distribution will be assured. Protection will thus be given to both small and large refineries in securing their supplies while at the same time consumers will be insured against excessive prices for gasoline and other oil products.

Men of the Industry

Changes in Personnel and Position

Motor Transportation Under Brig.-Gen. Drake

(*Continued from page* 307)

lery, and in each organization and station, there will be an officer of the Motor Transport Corps or an officer as acting Motor Transport Corps officer, designated Motor Transport Corps officer of that command, who is responsible for the efficient operation of the Motor Transport Corps within the limits of his command. His activities are controlled by G-1 in division or corps, and by G-4 in armies, in the same manner as are those of other representatives of technical and supply services in such commands. The functions of this officer are as follows:

First. He is in command of all motor transportation of the First Class, as defined above, and controls its operation as specified in paragraph 4-(h) above. He is also in command of all Motor Transport Corps maintenance and supply agencies on duty with the command.

Second. He exercises the functions of a staff officer as regards the supply of all Motor Transport Corps property for the command and as regards the technical supervision over motor vehicles of the Second Class provided for in paragraph 5 above.

To carry out this technical supervision, it will be his duty to make frequent inspections of all matters having any bearing on the motor transportation of the command. In making these inspections, he will be afforded every facility by all concerned. He will make frequent reports to the Divisions of the General Staff by whom his activities are controlled, covering such matters as the suitability of the personnel charged with operating motor vehicles, the mechanical condition of the vehicles, the conditions under which they are operated, needs for repair or overhaul, carelessness or waste on the part of any individual organization and similar matters, together with his recommendation as to any action that should be taken.

11—The chief of each department will submit on or before August 31, 1918, a list of funds appropriated for the design, purchase, equipment, repair and maintenance of motor vehicles as defined under paragraph 3 preceding. This last will show unexpended balances. The chief of each department will also submit the amount estimated and desired to be retained for purchase of special designs defined in paragraph 7 preceding. All unexpended balances of above appropriations will be transferred to the Disbursing Officer, Motor Transport Corps.

12—All existing contracts for motor vehicles, motor vehicle equipment and supplies, maintaining, operating and repairing motor vehicles, will be taken over by the Chief of the Motor Transport Corps, who will also make all future purchases and disbursements.

(322.02, *A. G. O.*)

II—Section II, General Orders, No. 38, *War Department,* 1918, *is rescinded.*

(322.02, *A. G. O.*)

By order of the Secretary of War:

PEYTON C. MARCH,
General, Chief of Staff.

Official:
H. P. McCain,
The Adjutant General.

Airplane Program Mercilessly Criticized

(*Continued from page* 334)

an experimental field and of the Wilbur Wright flying field at Dayton. The committee states that it feels obliged to note in this connection that shortly before negotiations for the McCook and the Wilbur Wright fields were completed Col. E. A. Deeds, a member of the aircraft board, was the owner of the first and a part owner of the second. He sold and transferred them to interests with which he had been identified. The committee states the number and amount of contracts for planes and engines are assigned to concerns at Dayton and Detroit, and the number and collection of aviation fields at Dayton could not fail to attract the attention of the complete senate committee. Due to the vast automobile industry, Detroit doubtless possesses more facilities for gas engine production than any other American community.

Industrially considered, the concentration of a great number of these two pursuits in these two cities may perhaps be justified but the committee is forced to the conclusion that the personnel of the aviation board from its formation to its reconstruction explains the fact. It recommends a commission of individuals and facilities for observation at the front who will work in relays between America and the front.

The Liberty engine is approved by the committee but is said to be imperfect yet, though rapidly approaching perfection. The committee complains that fighting planes have not been built around the Liberty engine and that our aircraft program will not be complete until one is. Only 2174 airplanes have been delivered to our army in France by our Allies.

The committee points out that the Allies have been hampered in deliveries of these planes because of our inability to supply them with raw materials. Our training planes are said to be excellent, both by the committee and by foreign experts who were called in.

The profits on the Liberty engines by our manufacturers are said to run as high as 34 per cent and on the Liberty engine aluminum pistons as high as 285 per cent on the capital invested. Numerous examples are told of in the report of the placing of contracts and their subsequent withdrawal to show the indecision existing with the original Aircraft Production Board.

W. S. S. Societies Formed at Ford Plant

DETROIT, Aug. 13—More than 700 war saving societies have been formed in the plant of the Ford Motor Co. Between 30,000 and 40,000 employees have agreed to take war savings or thrift stamps every week for a total that will reach the $2,000,000 mark within a year. The societies were organized at the Highland Park plant and at the blast furnaces in the River Rouge district. It is expected that many more societies will be formed in the Dearborn tractor plant of Henry Ford & Son.

Olds Given Trailer Contract

LANSING, MICH., Aug. 16—The Olds Motor Works has received government contracts for 2,100 portable kitchen trailers for aviation service. New equipment is being installed for manufacturing the trailers, and it is expected that actual work of turning out the trailers will be started by Sept. 1 and completed by Jan. 1.

McCord Expanding Plant

DETROIT, Aug. 17—The McCord Mfg. Co. is erecting a four-story addition to its plant, three stories to be used for factory purposes and the fourth to be used for offices. The new structure will be approximately 372 by 110, with area of 134,000 sq. ft., which, added to the present plant, will give a total floor area of 319,000 sq. ft.

Miller Rubber to Expand

AKRON, Aug. 16—The Miller Tire & Rubber Co. will take on a contract in the near future which will make it necessary to employ 400 or 500 additional men and girls. Officials of the company decline to disclose the nature of the contract, but it is assumed that it is a war order.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

Steel Products Co. Builds Powerhouse

The Steel Products Co., Cleveland, will build a one-story powerhouse at 2196 Clarkwood Road, Southeast. The structure will be 45 by 70 and will cost approximately $17,000.

L. W. Coppock has been appointed general engineer and chief in charge of production of the Lane Motor Truck Co., Kalamazoo, Mich., succeeding Harvey M. Stewart, who recently resigned as engineer of the Lane Motor company. Mr. Coppock was actively interested in the organization of the United Truck Co., Grand Rapids, and the Higrade Truck Co., Harper Springs, Mich.

Avery Co. Absorbs Davis Concern

MILWAUKEE, Aug. 17—The Davis Mfg. Co., Milwaukee, manufacturer of tractor engines, which recently was purchased by the Avery Co., Peoria, Ill., has lost its identity and from now on the big plant in West Allis will bear the name of the Peoria company exclusively. Frank M. Davis, however, continues as general manager of the unit. The Davis company has been manufacturing engines for Avery tractors and power farm machinery for several years and is now devoted exclusively to that purpose. One of the reasons why the Davis name is dropped is to facilitate operations under war-time conditions.

Talking Machine Co. Builds Airplane

PHILADELPHIA, Aug. 16—The first scouting hydro-airplane made from parts manufactured by the Victor Talking Machine Co. of Camden, has had a successful tryout. The plane was piloted by Lieutenant G. H. Pumpelly, who put it through its paces. The test showed the machine is capable of turning in a remarkably small area. Plain and fancy diving were features of the exhibition. The start was made from the Philadelphia Navy Yard at League Island, where the machine was assembled.

Reliance Co. Obtains Government Contract

APPLETON, WIS., Aug. 17—The Reliance Motor Truck Co., Appleton, Wis., which has just completed and equipped a new manufacturing plant at a cost of $75000 or more, has taken a large Government contract for machine-work on large calibre shells. Additional tools and other machinery for this work will be installed immediately. While the contract is being executed the Reliance company will continue to prepare for a large production of commercial cars and internal spur-gear drive rear axles, for which it already has booked contracts to keep the plant busy for months to come. Plans for an additional shop building are being prepared and work will begin before Sept. 1.

Cleveland Automatic Tool Enlarges

CLEVELAND, Aug. 16—The Cleveland Automatic Tool Co. has let contracts for a large addition to its plant at Central Avenue, Southeast and East Sixty-fifth Street. The company recently acquired the land adjoining its plant. The new structure will be two stories and will cost approximately $100,000.

BUSINESS CONDITIONS AS REPORTED TO THE FEDERAL RESERVE BOARD

The following summary of general business conditions on July 23, 1918, is based on reports from the 12 Federal bank districts

District	General Business	Crop Condition	Industries of the District	Construction, Building, and Engineering	Foreign Trade	Money Rates	Railroad, Post-office, and Other Receipts	Labor Conditions
No. 1, Boston	Active	Good	Busy	Small	Improved	Increased	Mixed	Unsatisfactory.
No. 2, New York	Activity limited only by shortage of raw materials.	Fairly good	Intensely active on war work.	Heavy decreases, except on Government work.	During fiscal year ending June 30 imports decreased 7 per cent, exports 14 per cent.	Firm; ruling rate 6 per cent.	Post office, June returns increase over 1917; telegraph, quarterly returns increase over 1917.	"Work or fight" order and Federal control of employment of unskilled workers somewhat relieves shortage.
No. 3, Philadelphia	Very good	Very good	Very busy	Building at lowest mark for a decade.	Shipment of war supplies continues heavy.	Continue firm	Increasing	Shortage in all lines.
No. 4, Cleveland	Satisfactory	Good	Active	Inactive		Very firm	Increase	Scarce; somewhat unsettled.
No. 5, Richmond	Active and profitable.	Unusually favorable.	Running to capacity; limited only by labor and supplies.	Private building negligible; Government housing active.	Restricted by lack of freight room.	Firm; 6 per cent	Railroad, irregular; post office, volume large; reflects increased rates.	Some slight improvement reported.
No. 6, Atlanta	Excellent	Good	Very active	Light, except Government work.	Very light	Slight increase	Slight increase	Very unsatisfactory.
No. 7, Chicago	Do.	Very good	Generally at capacity.	Stagnant		Firm	Post office receipts increase.	Insufficient supply.
No. 8, St. Louis	Good	Favorable	Active	Quiet		Do.	Decrease in post-office receipts.	More settled.
No. 9, Minneapolis	Do.	Good	Do.	Fair		Do.	No change	Good.
No. 10, Kansas City	Do.	Do.	Do.	Generally restricted to essentials.		Practically unchanged.		Scarcity more pronounced.
No. 11, Dallas	Satisfactory, considering summer season.	Fair	Do.	Below normal	Good	Unchanged; steady to firm.	Railroad, increase; post office, 52.7 per cent increase.	Unsatisfactory on account of shortage.
No. 12, San Francisco	Active	Good	Very active	Decreased 29 per cent from last month, but 16 per cent greater than June, 1917.	Large volume	Firm	Increasing	Settled.

Aircraft Production Purchases

WASHINGTON, Aug. 16—Following is a list of purchases recently contracted for by the Bureau of Aircraft Production:

July 31, 1918

Taft Pierce Manufacturing Co., Woonsocket, R. I., equipment for motor assembly plant.

Jas. Cunningham & Sons Co., Rochester, N. Y., 50 Burton type balloon windlasses.

The Russ Co., Cleveland, Ohio, 9500 carrying chests.

Eastman Kodak Co., Rochester, N. Y., license to the Government under patent No. 733,729 and reissue No. 12,637 for dopes, to make or have made and use the processes and products covered by the above mentioned patents for war purposes and during the period of the war.

Aug. 1, 1918

North Carolina Pine Emergency Bureau, Munsey Building, Washington, D. C., 5600 pieces lumber.

Canadian Aeroplanes (Ltd.), P. O. Box 638, Toronto, Ontario, Canada, spares for Canadian JN4-D planes, aileron fittings.

Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., spares for "V-2," Type 3, engine (470 items).

Aug. 2, 1918

George H. Maus, Amsterdam, N. Y., 60,000 bamboo poles.

The Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., spare parts for 436 JN6-H-T training planes, equipped with forward gun and dual control; engine bed bearers, cowls, elevators, landing gears, rudders, wings, etc.

Thomas Morse Aircraft Corp., Ithaca, N. Y., 150 gunnery airplanes, 84-C, complete.

Packard Piano Co., Fort Wayne, Ind., 1000 combat propellers for US-12 engines.

Hallet & Davis Piano Co., Boston, Mass., 1000 combat propellers for US-12 engines.

Zenith Carbureter Co., Detroit, Mich., 50 sets No. 48 D. C. carbureter and spare parts for Hispano-Suiza, 150-hp., Type A engine.

The Silvex Co., South Bethlehem, Pa., 24,000 spark plugs for use on Hispano-Suiza Type A, 150-hp. engine.

Aug. 3, 1918

Ford Motor Co., Detroit, Mich., spare parts according to "M" and "L" lists for 5000 Liberty engines.

The Simplex Wire & Cable Co., Boston, Mass., 3000 miles field wire.

Eastman Kodak Co., Rochester, N. Y., 50,000 gal. cellulose acetate dope.

Standard Seamless Tube Co., Ambridge, Pa., 70,500 ft. seamless steel tubing.

Bordentown Steel & Tube Co., Bordentown, N. J., 54,500 ft. seamless steel tubing.

B. F. Goodrich Co., Akron, Ohio, 10 supply balloons.

Aug. 15, 1918

W. M. Matthews & Bro., 620 Southern Building, Washington, D. C., 5000 breast reels, without spool.

Wayne Oil Tank & Pump Co., 1337 Meridian Place, Washington, D. C., 93 portable oil tanks.

J. C. Pushee & Sons, Boston, Mass., 20,662 brushes.

Continental Car Co. of America, Louisville, Ky., services in connection with crating 350 machine shop truck bodies.

Contracts

Standard Aircraft Corp., Elizabeth, N. J., 60,700 ft. seamless steel tubing.

Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., 40 sets wings, upper and lower, right and left, complete.

Unit Construction Co., Fifty-eighth Street and Grays Avenue, Philadelphia, Pa., 2700 air fans for driving 100-watt generator used on radio telephone combination transmitting and receiving set.

Aug. 20, 1918

Standard Aircraft Corporation, Elizabeth, N. J., for services in the erection of 1 British Handley-Page airplane.

Wright-Martin Aircraft Corp., New Brunswick, N. J., services and material in repairing motor returned from United States aerial mail station, Busleton, Pa.

Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., 436 JN6H advance training planes with dual control, and fixed gun only; 34 JN4H advance training planes with dual control, and fixed gun only for the Navy.

Splitdorf Electrical Co., Newark, N. J., 40 sets Dixie D800 magnetos and spare parts to be used in connection with all Hispano-Suiza engines using 1 right-hand and 1 left-hand magneto.

D. Nusbaum & Co., Union Course, L. I., N. Y., 7500 sweaters.

Wright-Martin Aircraft Corp., New Brunswick, N. J., repairs for Hispano-Suiza type A engines—crankshaft and hub assembly, crankcase assembly complete, water pump assembly, Dixie D800 magneto assembly, right-hand cylinder cover, tachometer drive assembly.

Long-Knight Lumber Co., Indianapolis, Ind., 100,000 feet walnut.

British Munition Board, London, England, 125 lenses for airplane cameras.

Wright-Martin Aircraft Corp., New Brunswick, N. J., spare parts for Hispano-Suiza engines — cylinder casting left-hand and right-hand aluminum assemblies, cylinder casting steel sleeve assembly.

Firestone Tire & Rubber Co., Akron, Ohio, 436 outer casings (latest type now in production for Curtiss JN6H advanced training planes).

Unit Construction Co., Philadelphia, Pa., material for 500 sets of laminations for Hand'ey-Page propellers.

Hardman, Peck & Co., New York, N. Y., 1000 sets of laminations for Handley-Page propellers.

C. F. Pease Co., Chicago, Ill., 1125 100-yard rolls X-electric blue print paper.

Lycoming Foundry & Machine Co., Williamsport, Pa., 15 sets tools, complete, for maintenance for Gnome airplane engines, type B2.

Lamp Co. Declares Dividend

The C. M. Hall Lamp Co. has declared a 6 per cent dividend on $600,000 of outstanding stock, payable Aug. 22, half in cash and half in Liberty bonds.

General Engineer Depot Contracts

WASHINGTON, Aug. 16—Following is a list of contracts placed by the General Engineer Depot:

Aug. 9, 1918

Penberthy Injector Co., Detroit, Mich., automatic injectors.

U. S. Rubber Co., New York City, conductor cables.

Aug. 10, 1918

Westinghouse Co., Schenectady, N. Y., grease cups.

General Electric Co., Washington, D. C., spares for motor.

Aug. 13, 1918

Goodyear Tire & Rubber Co., Philadelphia, Pa., belt clamps and rubber belting.

International Motor Co., Washington, D. C., spares for trucks.

Motor Transport Contracts

WASHINGTON, Aug. 16—Contracts for 5000 AA trucks were placed by the Motor Transport Service as follows:

J. C. Wilson Truck Co., Lexington Motor Co., Velie Motors Corp., Auburn Auto Co., Dort Motor Car Co., Hupp Motor Car Co., Elgin Motor Car Corp., General Motors Truck Co., Standard Motor Truck Co., Saxon Co.

The AA standard army truck is an adaptation of the G. M. C. ¾-ton truck No. 16, which replaced the original AA model.

Developing Standard Compass Tests

WASHINGTON, Aug. 19—The Bureau of Standards is making an investigation of magnetic compasses. The Bureau will develop a standard method of testing compasses and will prepare specifications for their purchase by the Government. A special form of magneto-meter has been devised to determine the magnetic movement and rotation test for pivot friction. It is expected that several thousand compasses will be tested in the course of the present year.

Ford Motor Co. Files Suit

MILWAUKEE, Aug. 17—The Ford Motor Co. has filed suit in the circuit court at Milwaukee against the Lippow Cycle Co., 704 North Avenue, to force it to remove a sign announcing the sale of Ford accessories and supplies. The Ford company claims the Lippow company is using the Ford trade mark illegally.

Calendar

ENGINEERING

Sept. 2—Cripple Creek, Colo. American Institute of Mining Engineers.

Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.

ASSOCIATIONS

Oct. 7-12—Milwaukee. American Foundrymen's Assn. and 5 allied organizations. Milwaukee Auditorium.

SHOWS

Aug. 19-24—Erie, Pa. Tractor demonstration (Exposition Grounds).

Aug. 20—North Rose, Wayne Co. Tractor demonstration. State Food Commission. Calvin J. Huson, Director.

Aug. 24—Herkimer, N. Y. Tractor demonstration (Field Day). Chas. A. Taylor in charge.

Aug. 28—Gates Center, Monroe Co. Tractor demonstration (State Fair) Food Commission. Calvin J. Huson, Director.

Aug. 28—Concord, N. H. Tractor demonstration (County Farm Bureaus). M. C. Wilson, Director, Agriculture Extension, Dunham, N. H.

Aug. 29—Laconia, N. H. Tractor demonstration (County Farm Bureaus). M. C. Wilson, Director, Agriculture Extension, Dunham, N. H.

Aug. 28-30—West Raleigh, N. C. Tractor demonstration (Farmers' Convention, College Farm). Dr. R. Y. Winters in charge.

Aug. 30—Campton, N. H. Tractor demonstration (Albamont Farms). H. G. Gulliver, Mgr.

Aug. 30—Cheshire, Conn. Tractor demonstration (New Haven County Farm). Mr. Harvey, Mgr.

Sept. 2-6 — Hartford, Conn. Tractor demonstration (State Fair). Will F. Landon, Sec.

Sept. 2-7—Indianapolis, Indiana, State Fair. Indianapolis Automobile Trade Assn.

Sept. 5—Medina, Orleans Co. Tractor demonstration (State Fair) Food Commission. Calvin J. Huson, Director.

Sept. 9-14—Milwaukee. Milwaukee Automobile Dealers, Inc. Fourth Annual Wisconsin State Fair. Hart J. Ruddle, Mgr.

Sept. 9-14 — Syracuse, N. Y. Tractor demonstration (State Fair). J. Dan Ackerman, Secy.

Sept. 17-20—Riverhead, L. I. Tractor demonstration (County Fair). Harry Lee, Sec.

Sept. 30-Oct. 4—Trenton, N. J. Tractor demonstration (Trenton Fair). Harry B. Salter, Supt.

RACING

Sept. 2—Uniontown. Uniontown Speedway Assn.

Sept. 7 — Chicago. Chicago Speedway.

Sept. 21—Sheepshead Bay.

Oct. 5 — Cincinnati. Cincinnati Speedway.